PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XL—No. 3

MARCH, 1914

Edited by the Secretary, under the direction of the Committee on Publications.

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CONTENTS

Society Affairs.....Pages 175 to 230.
Papers and Discussions.....Pages 549 to 814.

NEW YORK 1914

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American Society of Civil Engineers

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TO INVESTIGATE CONDITIONS OF EMPLOYMENT OF, AND COMPENSATION OF, CIVIL ENGINEERS: Alfred Noble, S. L. F. Deyo, Dugald C. Jackson, William V. Judson, George W. Tillson, C. F. Loweth, John A. Bensel.

TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, Edward C. Shankland, Edwin Duryea, Jr., James C. Meem, Walter J. Douglas, Samuel T. Wagner, Frank M. Kerr.

ON A NATIONAL WATER LAW: F. H. Newell, George G. Anderson, Charles W. Comstock, Clemens Herschel, W. C. Hoad, Robert E. Horton, John H. Lewis, Charles D. Marx, Gardner S. Williams.

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TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, J. B. Berry, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Emil Gerber, Robert W. Hunt, George W. Kittredge, William McNab, G. J. Ray, F. E. Turneaure, J. E. Willoughby.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER.....5913 Columbus.
CABLE ADDRESS.....“Ceas, New York.”

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AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

CONTENTS

	PAGE
Minutes of Meetings:	
Of the Society, February 18th and March 4th and 11th, 1914	175
Announcements:	
Hours during which the Society House is open	183
Future Meetings	183
Annual Convention	183
Searches in the Library	183
The J. James R. Croes Medal	184
Papers and Discussions	184
Local Associations of Members of the American Society of Civil Engineers	185
Privileges of Engineering Societies Extended to Members	187
Accessions to the Library:	
Donations	190
By purchase	193
Membership (Additions, Changes of Address, Resignations, Deaths)	195
Recent Engineering Articles of Interest	205

MINUTES OF MEETINGS

OF THE SOCIETY

February 18th, 1914.—The meeting was called to order at 8.30 P. M.; T. Kennard Thomson, Director, in the chair; Chas. Warren Hunt, Secretary; and present, also, 129 members and 15 guests.

A paper by Harold A. Rands, Assoc. M. Am. Soc. C. E., entitled "Grouted Cut-Off for the Estacada Dam", was presented by H. V. Schreiber, M. Am. Soc. C. E., and illustrated with lantern slides. Mr. Schreiber also presented communications on the subject from Messrs. S. Howard Rippey and S. C. Hulse. The Secretary read discussions by Messrs. William H. Cushman and H. L. Coburn. The paper was discussed orally by Messrs. Lazarus White, H. V. Schreiber, Wilson Fitch Smith, and V. H. Hewes.

A paper by A. L. Harris, Assoc. M. Am. Soc. C. E., entitled "Diversion of Irrigating Water from Arizona Streams", was presented in abstract by the Secretary.

The Secretary announced the following death:

DAVID NEILSON MELVIN, of Linoleumville, N. Y., elected Member, July 3d, 1878; died January 27th, 1914.

Adjourned.

March 4th, 1914.—The meeting was called to order at 8.30 P. M.; President Hunter McDonald in the chair; Chas. Warren Hunt, Secretary; and present, also, 164 members and 11 guests.

The minutes of the Annual Meeting, January 21st, and of the meeting of February 4th, 1914, were approved as printed in *Proceedings* for February, 1914.

The President announced that the Board of Direction, realizing that the canvass of the ballots on the proposed amendments to the Constitution would require a good deal of time, had appointed a committee of its own members for that purpose.

The proposed amendments are as follows:

AMENDMENT "A"

Amend Article VII—Nomination and Election of Officers—as follows:

Strike out Section 1, and substitute the following:

"The Board of Direction shall, from time to time, divide the territory occupied by the membership into thirteen geographical districts, to be designated by numbers. District No. 1 shall be the territory within fifty miles of the Post Office in the City of New York. Each of the other districts shall be, as nearly as practicable, contiguous territory, and shall be designated as Districts Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13. The Board shall announce such division to the Society on or before the first day of March in each year."

Strike out the first paragraph of Section 2, and substitute the following:

"At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, shall be appointed by the meeting to serve for two years. They shall be selected so as to provide, with the seven members holding over, two members from District No. 1, and one from each of the remaining twelve Districts; and these, with the five living last Past-Presidents of the Society, shall be a committee to nominate officers for the Society."

Strike out the word "and" in the fifteenth line of the third paragraph of Section 2, and after the figure "7" add: "8, 9, 10, 11, 12, and 13."

AMENDMENT "B"

Amend Article VII—Nomination and Election of Officers—as follows:

Strike out Section 1, and substitute the following:

"1.—The Board of Direction shall, from time to time, divide the territory occupied by the membership into thirteen geographical districts, to be designated by numbers. District No. 1 shall be the territory within fifty miles of the Post Office in the City of New York. Each of the other districts shall be, as nearly as practicable, contiguous territory, and shall be designated as Districts Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13. The Board shall announce such division to the Society on or before the first day of March in each year."

Section 2.—Strike out Paragraphs 1 and 2, and substitute the following:

"2.—Seven corporate members, not officers of the Society, shall be elected annually by the members in the respective districts to serve for two years. They shall be elected so as to provide with the seven members holding over, two members from District No. 1, and one from each of the remaining twelve districts and these, with the five living last past Presidents of the Society, shall be a committee to nominate officers for the Society.

The manner of election shall be as follows:

Directly after the first day of October of each year, there shall be mailed to each corporate member in each district where an election is to be held a notice with form and envelope for voting, requesting him to suggest the name of one corporate member (not an officer of the Society) from his district as a candidate for nomination for member of the nominating committee; these suggestions to be made to the Board of Direction by a preliminary letter-ballot to be received by the Board at a meeting to be held about the first of November, and opened at said meeting, and counted under the direction of the Board. The polls shall be closed at noon on the day of said meeting and the time of closing the polls shall be stated in said notice. At least thirty days before the annual meeting there shall be mailed to every corporate member, a second notice with form for voting, said notice to state the time of closing of the polls on the final ballot, and to contain as nominees for the nominating committee from each voting district the names and residences of the two persons receiving the highest number of votes in each district, and such others as may have received the same number of votes as one of these in order of their standing, and the number of votes cast for each as the result of the preliminary ballot. On the final ballot the polls shall close at noon on the day preceding the annual meeting, and the ballots shall be canvassed under the direction of the Board. The members receiving the highest number of votes in their respective districts on the final ballot shall be declared elected members of the nominating committee. Announcement of elections by this ballot shall be made

at the annual meeting. In case of a tie vote in any district the annual meeting shall elect the member of the nominating committee from among the persons so tied. Vacancies in the Nominating Committee may be filled by the Board of Direction."

Paragraphs 3 and 4 of Section 2 of Article VII shall constitute a new section numbered 3, and for the words "This Committee" in the first line of Paragraph 3 substitute the words "The Nominating Committee"; and in line fifteen of the same paragraph strike out the word "and," and after the figure "7" add: "8, 9, 10, 11, 12, and 13."

Sections 3, 4, 5, 6, and 7 of Article VII shall be numbered Sections 4, 5, 6, 7, and 8, respectively.

In the second sentence of present Section 5 (new Section 6) of Article VII, insert after the word "nominated" the words "for Officers of the Society," so the said sentence shall read "This ballot shall include the names and residences of all persons nominated for Officers of the Society in accordance with this Article, their grades of membership, and, in case of nominees for Directors, the number of the district in which they reside."

AMENDMENT "C"

Amend Articles V and VI as follows:

Article V, Section 1.—Strike out the first sentence and substitute the following:

"The officers of the Society shall be a President, four Vice-Presidents, eighteen Directors, a Secretary, and a Treasurer. These officers, except the Secretary, together with the five latest living Past-Presidents, who continue to be members, shall constitute the Board of Direction in which the government of the Society shall be vested, and who shall be the Trustees as provided for by the laws under which the Society is organized."

Article V, Section 2.—First Paragraph. In first sentence strike out, "Secretary", so that the sentence shall read as follows:

"The terms of office of the President and Treasurer shall be one year; of the Vice-Presidents, two years; and of the Directors, three years."

Second Paragraph. In first line insert after the word "officer" the words "elected by the Society" so that the paragraph shall read:

"The term of each officer elected by the Society shall begin at the close of the Annual Meeting at which such officer is elected, and shall continue for the period above named or until a successor is duly elected."

Article VI, Section 4.—Strike out the first two paragraphs of the section and substitute therefor the following:

"The Secretary shall be a Corporate Member of the Society. He shall be elected annually by letter-ballot of the Board of Direction, which shall be ordered not less than 20 days after the Annual Meeting.

The ballots shall be returned to tellers, appointed by the President and canvassed at a meeting of the Board. A majority of the whole Board shall be required to elect.

The Secretary shall hold office until his successor is elected, shall devote his whole time to his duties, shall be under the direction of the President and the Board of Direction, and shall be the executive officer of the Society."

Article VI, Section 6.—Strike out this Section and substitute therefor the following:

"6.—The Secretary and Treasurer shall be paid salaries to be determined by a majority of the Board of Direction, this vote to be taken by letter-ballot to be canvassed by the Board of Direction. All other salaries shall be fixed from time to time, by the Board of Direction."

The Secretary presented the report of the Tellers, as follows:

The undersigned Tellers, having canvassed the ballots on the amendments to the Constitution, report as follows:

Total number of ballots received	3 203
Ballots from those not entitled to vote, or otherwise defective	26
Total number of ballots canvassed	3 177
Amendment "A"	
Number of ballots in favor	1 494
Number of ballots opposed	1 628
Number of ballots necessary to carry amendment	2 081
Amendment "B"	
Number of ballots in favor	1 550
Number of ballots opposed	1 612
Number of ballots necessary to carry amendment	2 108
Amendment "C"	
Number of ballots in favor	1 343
Number of ballots opposed	1 828
Number of ballots necessary to carry amendment	2 114

HUNTER MCDONALD,
HENRY W. HODGE,
ARTHUR S. TUTTLE,
J. A. OCKERSON,
MORDECAI T. ENDICOTT,
GARDNER S. WILLIAMS,
J. WALDO SMITH,
CHAS. WARREN HUNT,
E. GERBER.

MARCH 4TH, 1914.

The President declared that all the amendments were lost, not having received two-thirds of all ballots cast.

A paper by John C. Koch, Assoc. M. Am. Soc. C. E., entitled "An Investigation of Sand-Clay Mixtures for Road Surfacing" was presented in abstract by the Secretary, and the subject was discussed by Messrs. Arthur H. Blanchard, James Owen, and Spencer J. Stewart.

H. deB. Parsons, M. Am. Soc. C. E., addressed the meeting briefly on the subject of the Main Drainage of New York City.

The Secretary announced the election of the following candidates on March 4th, 1914:

As Members

Martin Joachimson, New York City
John George Gale Kerry, Toronto, Ont., Canada
Robert Edgar Milligan, New York City
Arthur Alvord Stiles, Austin, Tex.
Charles Mason Talbert, St. Louis, Mo.
Harry True Welty, New York City

As Associate Members

Frederick Wilhelm Albert, Washington, D. C.
John Joseph Baker, Mineral Point, Pa.
Earl Huntington Barber, Boston, Mass.
Orville Berton Carlisle, Chicago, Ill.
William Henry Evers, Cleveland, Ohio
Trygve Daniel Bodtker Groner, Salt Lake City, Utah
Cecil Shields Haig, Fortaleza, Ceara, Brazil
Andrew Pearson Hoover, Paterson, N. J.
Edward Horton Jones, Clifton, Ariz.
Sargent Felix Jones, Edmonton, Alta., Canada
Walter John Kackley, Miami, Fla.
John Laylin, Columbus, Ohio
Gustav Jaeger Requardt, Baltimore, Md.
Daniel Bell Sayer, Albany, N. Y.
Howard French Schryver, Columbus, Ohio
Stephen Elliott Shoup, Cincinnati, Ohio
Maurice Joseph Sullivan, Houston, Tex.
Henry Casper Tammen, Kansas City, Mo.
Henry Jackson Tippet, Vancouver, B. C., Canada
Richard John Wulzen, Juneau, Alaska

As Juniors

Harry Arthur Armstrong, Sacramento, Cal.
John Goodin Bailhache, San Francisco, Cal.
Jacob Bendel, New York City

CLARENCE WINSTON COOPER, Wilson, N. C.
WALLACE DUNCAN DU PRE, Spartanburg, S. C.
DAVID ARTHUR HEDLUND, Spokane, Wash.
THEODORE SCHUYLER HERSEY, San Francisco, Cal.
WILLIAM HOLDEN, Fort Worth, Tex.
WILLIAM HUGO JAENICKE, San Francisco, Cal.
EMORY WILSON LANE, Ithaca, N. Y.
JUAN LORIA MATAMOROS, Washington, D. C.
LEONARD KYRAN MOYLAN, Troy, N. Y.
GEORGE WASHINGTON RAPELLI-OLIVER, Buenos Aires, Argentine Republic
JOHN WAGNER, JR., Phœnixville, Pa.

The Secretary announced the transfer of the following candidates on March 4th, 1914:

FROM ASSOCIATE MEMBER TO MEMBER

LAURENCE ADAMS BALL, New York City
SHIRLEY CLARK HULSE, Bedford, Pa.
RAY EMERSON KOON, Portland, Ore.
CHESTER ALEXANDER SMITH, Kansas City, Mo.
THEODORE NELSON SPENCER, Philadelphia, Pa.

FROM JUNIOR TO ASSOCIATE MEMBER

GEORGE SIMPSON ARMSTRONG, London, England
ROY CECIL GRAY, Kansas City, Mo.
TOM HIND HUDSON HARROD, Parr, S. C.
CYRUS PIERCE HOWES, São Paulo, Brazil
KENNETH HOWARD OSBORN, Cleveland, Ohio
CLIFFORD FRENCH PHILLIPS, St. Louis, Mo.
HENRY SLICER REGESTER, JR., Baltimore, Md.

The Secretary announced the following death:

WEBSTER GAZLAY, of Louisville, Ky., elected Member, June 7th, 1905; died February 17th, 1914.

Adjourned.

SPECIAL MEETING

March 11th, 1914.—The meeting was called to order at 8. 30 P. M.; Vice-President J. Waldo Smith, in the chair; Chas. Warren Hunt, Secretary; and present, also, 238 members and 37 guests.

The Chairman announced that the meeting had been called for the purpose of discussing the Progress Report of the Special Committee on the Valuation of Public Utilities.

Frederic P. Stearns, Past-President, Am. Soc. C. E., Chairman of the Committee, opened the discussion, illustrating his remarks with lantern slides. The subject was discussed also by Messrs. Alexander C. Humphreys, F. Lavis, H. C. Phillips, W. W. Crehore, P. W. Henry, Morris Knowles, A. G. Nicolaysen, F. B. Maltbie, and Henry Floy.

On motion, duly seconded, the meeting was adjourned until a date to be fixed later by the Board of Direction.

(Since adjournment of the meeting the date for continuing this discussion has been fixed for Thursday, April 2d, 1914, at 2.30 P. M. If necessary, the discussion will be continued at 8.30 P. M.)

ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

April 1st, 1914.—8.30 P. M.—A regular business meeting will be held, and a paper by F. Lavis, M. Am. Soc. C. E., entitled "The Gauge of Railways, with Particular Reference to Those of Southern South America", will be presented for discussion.

This paper is printed in this number of *Proceedings.*

April 2d, 1914.—2.30 P. M.—A Special Meeting for continuing the discussion on the Progress Report of the Special Committee on the Valuation of Public Utilities, has been fixed for Thursday, April 2d, 1914, at 2.30 P. M. If necessary the discussion will be continued at 8.30 P. M.

April 15th, 1914.—8.30 P. M.—At this meeting a paper by J. A. L. Waddell, M. Am. Soc. C. E., entitled "The Possibilities in Bridge Construction by the Use of High-Alloy Steels", will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL CONVENTION

The Forty-sixth Annual Convention of the Society will be held at Baltimore, Md., from June 2d to 5th, 1914, inclusive.

The following Committees to take charge of arrangements have been appointed:

Committee of the Board of Direction:

JAMES H. EDWARDS,
GEORGE W. FULLER, CHAS. WARREN HUNT.

Local Committee of Arrangements:

FRANCIS LEE STUART, *Chairman.*

MENDES COHEN, W. ANDERSON POLK,
W. W. CROSBY, LAYTON F. SMITH,
J. E. GREINER, H. A. WARREN,
F. H. HAMBLETON, E. B. WHITMAN.

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

In reference to this work, the Appendices* to the Annual Reports of the Board of Direction for the years ending December 31st, 1906, and December 31st, 1910, contain summaries of all searches made to date.

THE J. JAMES R. CROES MEDAL

This new medal has just been awarded for the first time. The rules for its award will be found in the List of Members. For the information of members photographs of it are here reproduced. The medal is of fine gold and so arranged that it can be made useful as a watch fob.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

* *Proceedings*, Vol. XXXIII, p. 20 (January, 1907); Vol. XXXVII, p. 28 (January, 1911).

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the Palace Hotel, on the third Friday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary of the Association, E. T. Thurston, Jr., M. Am. Soc. C. E., 713 Mechanics' Institute, 57 Post Street.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

(Abstract of Minutes of Meeting)

December 19th, 1913.—The Annual Meeting was called to order; President Wing in the chair; E. T. Thurston, Jr., Secretary; and present, also, 74 members and guests.

The Reports of the Secretary and Treasurer, respectively, were read, and the following officers were elected:

President, C. H. SNYDER,
Vice-President, H. L. HAEHL.

A paper by Mr. J. B. Pope, Assistant Engineer of the Southern Pacific Company, on "The Valuation and Original Cost of Railroads", was presented by the author, and the subject was discussed by Messrs. C. E. Grunsky and F. T. Robson.

Adjourned.

Colorado Association

The meetings of the Colorado Association of Members of the American Society of Civil Engineers are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary, Roger W. Toll, Assoc. M. Am. Soc. C. E., 700 Tramway Building, Denver, Colo. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays, at 12.30 P. M., and, until further notice, will take place at the lunch room of the Denver Dry Goods Company.

Visiting members are urged to attend the meetings and luncheons.

(Abstract of Minutes of Meeting)

February 14th, 1914.—The meeting was called to order; President Ridgway in the chair; E. F. Vincent, Vice-President, acting as Secretary; and present, also, 20 members and guests.

The minutes of the meeting of January 9th, 1914, were read and approved.

An emblem for use on stationery, etc., was adopted by the Association, consisting of the shield of the American Society of Civil Engineers, surrounded by a shield-shaped band bearing the words "Colorado Association of Members".

The proposed Amendments to the Constitution of the Society were discussed.

A paper by John E. Field, M. Am. Soc. C. E., on "Interstate Water Rights", was presented by the author, and was followed by a general discussion of the subject and of International Water Rights.

Adjourned.

Atlanta Association

The Atlanta Association of Members of the American Society of Civil Engineers was organized on March 14th, 1912. The Association holds its meetings at the University Club.

At the meeting of the Association on December 29th, 1913, the new Chairman, John Ruddle, M. Am. Soc. C. E., was installed, and Messrs. Park A. Dallis and G. R. Solomon were appointed members of the Executive Committee. T. P. Branch, Assoc. M. Am. Soc. C. E., was elected Secretary.

Philadelphia Association

On December 22d, 1913, the Philadelphia Association of Members of the American Society of Civil Engineers was organized, with the following officers: George S. Webster, President; Richard L. Humphrey and F. Herbert Snow, Vice-Presidents; John Sterling Deans, J. W. Ledoux, Edgar Marburg, and H. S. Smith, Directors; S. M. Swaab, Treasurer; and W. L. Stevenson, Secretary. The meetings of the Association will be held at the Engineers' Club of Philadelphia, 1317 Spruce Street.

Portland, Ore., Association

On June 18th, 1913, the Portland, Ore., Association of Members of the American Society of Civil Engineers was organized with the following officers: E. G. Hopson, President; W. S. Turner, First Vice-President; D. D. Clarke, Second Vice-President; G. B. Hegardt, Treasurer; and Charles J. McGonigle, Secretary.

Seattle Association

At the Annual Meeting of the Association, held on January 26th, 1914, the following officers were elected for the ensuing year: Ernest B. Hussey, President; A. H. Fuller, Vice-President; and Carl H. Reeves, Secretary-Treasurer.

Southern California Association

On January 5th, 1914, the Southern California Association of Members of the American Society of Civil Engineers held its first meeting at the University Club, Los Angeles, Cal., and elected the following officers: J. B. Lippincott, President; Charles T. Leeds, First Vice-President; George S. Binckley, Second Vice-President; W. K. Barnard, Secretary; and Charles H. Lee, Treasurer.

Spokane Association

At its meeting of March 4th, 1914, the Board of Direction considered and approved the proposed Constitution of the Spokane Association of Members of the American Society of Civil Engineers.

The following officers have been elected: President, C. S. MacCalla; Vice-President, U. B. Hough; Second Vice-President, Morton Macartney; Secretary-Treasurer, A. D. Butler.

Texas Association

At its meeting of December 31st, 1913, the Board of Direction considered and approved the proposed Constitution of the Texas Association of Members of the American Society of Civil Engineers.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

American Institute of Mining Engineers, 29 West Thirty-ninth Street, New York City.

American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York City.

Architekten-Verein zu Berlin, Wilhelmstrasse 92, Berlin W. 66, Germany.

Associação dos Engenheiros Civis Portuguezes, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 413 Dorchester Street, West, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building, Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

Dansk Ingeniorforening, Amaliegade 38, Copenhagen, Denmark.

Engineers and Architects Club of Louisville, 1412 Starks Building, Louisville, Ky.

Engineers' Club of Baltimore, Baltimore, Md.

Engineers' Club of Minneapolis, 17 South Sixth Street, Minneapolis, Minn.

Engineers' Club of Philadelphia, 1317 Spruce Street, Philadelphia, Pa.

Engineers' Club of St. Louis, 3817 Olive Street, St. Louis, Mo.

Engineers' Club of Toronto, 96 King Street, West, Toronto, Ont., Canada.

Engineers' Society of Northeastern Pennsylvania, 415 Washington Avenue, Scranton, Pa.

Engineers' Society of Pennsylvania, 219 Market Street, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania, 2511 Oliver Building, Pittsburgh, Pa.

Institute of Marine Engineers, 58 Romford Road, Stratford, London, E., England.

Institution of Engineers of the River Plate, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.

Institution of Naval Architects, 5 Adelphi Terrace, London, W. C., England.

Junior Institution of Engineers, 39 Victoria Street, Westminster, S. W., London, England.

Koninklijk Instituut van Ingenieurs, The Hague, The Netherlands.

Louisiana Engineering Society, Room 6, City Bank and Trust Company Building, New Orleans, La.

Memphis Engineering Society, Memphis, Tenn.

Midland Institute of Mining, Civil and Mechanical Engineers, Sheffield, England.

Montana Society of Engineers, Butte, Mont.

North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, England.

Oesterreichischer Ingenieur- und Architekten-Verein, Eschenbachgasse 9, Vienna, Austria.

Pacific Northwest Society of Engineers, 803 Central Building, Seattle, Wash.

Rochester Engineering Society, Rochester, N. Y.

Sachsischer Ingenieur- und Architekten-Verein, Dresden, Germany.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingenieurs Civils de France, 19 rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Svenska Teknologforeningen, Brunkebergstorg 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18–1, Copenhagen, Denmark.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

ACCESSIONS TO THE LIBRARY

(From February 3d to March 2d, 1914)

DONATIONS*

A TREATISE ON THE INSPECTION OF CONCRETE CONSTRUCTION:

Containing Practical Hints for Concrete Inspectors, Superintendents, and Others Engaged in the Construction of Public and Private Works. By Jerome Cochran, Jun. Am. Soc. C. E. Cloth, 9¼ x 6¼ in., 15 + 595 pp. Chicago, Myron C. Clark Publishing Company, 1913. $4.00.

The preface states that the author's intention in this book is to set forth in detail all the principal points on which information is likely to be wanted by an inspector on concrete construction and all the essentials governing the construction of reinforced concrete structures. The subject-matter is said to consist of a series of rules and directions to be followed in inspecting concrete construction, with brief explanations of the reasons for each rule and of their importance, and an endeavor has been made to observe a logical order and a due proportion between the different parts in order to produce the work in a form for convenient use and ready reference. Some of the matter, it is stated, has been collected from engineering periodicals and from the publications of engineering societies, but much of it has been taken from the personal records of the author, and he hopes that the book may be found useful by those engaged in the inspection, supervision, and construction of work involving the use of concrete. The Chapter headings are: Inspection of Hydraulic Cement; Inspection of Sand, Stone and Miscellaneous Concrete Materials; Inspection of Proportioning and Mixing Concrete; Inspection of Forms, Molds, Centering and Falsework; Inspection of Steel Reinforcement; Inspection of Concreting; Inspection of Surface Finishes for Concrete Work; Inspection of Waterproofing for Concrete Work; Inspection of Concrete Sidewalk, Curb, and Pavement Construction; Inspection of Concrete Products; Inspection of Molding and Driving Concrete Piles; Index.

THE ELECTRIC PROPULSION OF SHIPS.

By H. M. Hobart. Cloth, 8¾ x 5½ in., illus., 12 + 167 pp. London and New York, Harper & Brothers, 1911. $2.00.

The attention of engineers is being called, it is stated, with increasing frequency to the question as to whether or not it is commercially advantageous to incorporate electrical apparatus in the machinery used for propelling ships, and in this book, the author has endeavored to show conclusively that such applications are commercially advantageous in many cases, to outline roughly their limitations, and to indicate the boundary line between appropriate and inappropriate cases. The Contents are: Introductory; The Size and Power of Ships; The Energy Required per Ton-Mile in Propelling Ships at Constant Speed; The Frictional Resistance of Ships; The Momentum of Ships; The Speed and Efficiency of Propellers; Mechanical Speed-Reduction Gearing for Steam Turbines; Electrical Speed-Reduction Gearing for Steam Turbines; The Use of Superheated Steam in Marine Engines; Electrical Gear as a Means for Improving the Load Factor; Internal-Combustion Engines for Ship Propulsion; Alternating and Continuous Electricity for Ship Propulsion; Some Systems of Propelling Ships Electrically; The Alter-Phase System for Ship Propulsion; The Durtnall System of Propelling Ships; The Emmet System of Ship Propulsion; Index.

DER DIESELMYTHUS:

Quellenmässige Geschichte der Entstehung des heutigen Oelmotors. Von J. Lüders. Paper, 10 x 6¾ in., illus., 236 pp. Berlin, M. Krayn, 1913. 4.50 Marks.

As stated in the title, this book is a history of the Diesel motor, based on a study of the original and other patents secured on the same by the late Dr. Diesel. The author states in his Introduction that this work is based on scientific and technical proofs which are accessible to every one that, although Dr. Diesel gave the impetus to the perfecting of oil motors and to their practical use, his title as inventor of them needs the correction which has been given in detail in these pages. The Contents are: Einleitung; Verzeichnis der benutzten Schriften; Diesels Patent

* Unless otherwise specified, books in this list have been donated by the publishers.

No. 67 207 vom 28. Februar 1892; Diesels Broschüre (Anfang 1893); Die Kritiker der Broschüre Diesels; Diesels Patent No. 82 168 vom 30. November, 1893; Diesels Versuche mit dem neuen Motor (1893-1897); Schröters und Diesels Vorträge in Cassel (1897); Die Kritiker des Casseler Vortrages; Diesels Vortrag in Berlin (1912); Diesels Schrift: "Die Entstehung des Dieselmotors" (Herbst 1913).

TIN DEPOSITS OF THE WORLD

With a Chapter on Tin Smelting. By Sydney Fawns. Third Edition. Cloth, 8¾ x 5½ in., illus., 10 + 306 pp. London, The Mining Journal.

In this, the third edition, the author, it is stated, has made every effort to bring the information contained herein as far as possible up to date, and in such endeavor many of the chapters have been entirely re-written and new and interesting details added. The various methods and machines used in tin mining have been described, it is said, to cover the latest accepted practices. All the statistics have been corrected and the latest authentic published reports from each tin-producing center are included. A bibliography of the subject is also given. The Contents are: The Common Forms of Stanniferous Minerals and the Early History of Tin Mining; Description of Tin Deposits; Alluvial Tin Mining; Alluvial Tin Deposits of the Malay Peninsula; Tin Lode Deposits in the Malay Peninsula; Alluvial Deposits of Banca, Billiton, Singkep, Siak, Sumatra, Siam, British Burma, Shan States, and French Indo-China; Tin Deposits of Bolivia; Tin Deposits of Africa; Tin Deposits of Cornwall; Mount Bischoff Tin Mine; Tin Deposits of Tasmania; Tin Deposits of New South Wales; Tin Deposits of Queensland; Tin Deposits of Western Australia, Northern Territory of South Australia, Victoria, and New Zealand; Tin Deposits of Central Europe, Spain, Portugal, France, Italy, Scotland, Ireland; Tin Deposits of China, Japan, Greenland, Finland, Korea, Siberia; Tin Deposits of Mexico, United States of America, York Regions of Alaska; Tin Crushing and Dressing Machinery; Dredging for Tin; Methods of Tin Assaying; Statistics of Tin Production; Tin Smelting; Bibliography; Index.

THE NEW BUILDING ESTIMATOR:

A Handbook for Architects, Builders, Contractors, Engineers, Superintendents, and Draftsmen. By William Arthur. Eleventh Edition, Revised and Enlarged. Leather, 7 x 4¾ in., illus., 705 pp. New York, David Williams Company, 1913. $3.00.

In a secondary title, it is stated that this book is a practical guide to estimating the cost of labor and materials in building construction from excavation to finish. In addition to dealing with standard construction, detailed figures for reinforced concrete and many chapters on Square, Cubic Foot, Comparative Costs, Physical Valuations, and on Depreciation are given, all of which, it is hoped, will be found useful by architects, contractors, and by railroad engineers. In addition to the ordinary tabulated matter, there are also special tables for quick calculation, including a series for estimating plaster. An hourly wage table is also included, as well as many practical examples of various types of construction. The Contents are: Part I, Approximate Estimating; Part II, Detailed Estimating.

THE MINING WORLD INDEX OF CURRENT LITERATURE,

Vol. III, First Half Year, 1913. By George E. Sisley. Cloth, 9¼ x 6 in., 26 + 158 pp. Chicago, Mining World Company, 1913.

This publication, the first volume of which appeared in August, 1912, is, as stated on the title-page, an international bibliography of Mining and the Mining Sciences, compiled and revised semi-annually from the Index of the World's Current Literature, which appears weekly in *Mining and Engineering World*. In this, the third, volume which covers the field of mining, metallurgy, and kindred subjects for the first six months of 1913, but few changes have been made, one new feature being a list of the publications indexed, including periodicals, books, and transactions, bulletins, etc., of schools, societies, and Government bureaus. The subject-matter is divided into classes, under which the entries are arranged alphabetically by subject and author, and includes the title of the article (which, if in foreign languages, is usually followed by translations or explanations in English), a brief amplification or explanation when the title is insufficient, the name of the journal in which the article appeared or where abstracts of it may be found, the date and page number, the approximate number of words in the article, and the price, which arrangement, it is hoped, will be appreciated by those whose library facilities are limited, which condition applies, it is said, at nearly all mines and mining centers. The Contents are: Metals and Metal Ores; Non-Metals; Mines and Mining; Mills and Milling; Chemistry and Assaying; Metallurgy; Power and Machinery; Miscellaneous.

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U. S.-Bureau of Insular Affairs. 1 pam.
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U. S.-Chief of Engrs. 28 specif.
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U. S.-Interstate Commerce Comm. 1 vol., 1 pam.
U. S.-National Museum. 1 bound vol., 1 vol.
U. S.-Reclamation Service. 2 bound vol., 1 vol., 1 map.
U. S.-War Dept. 1 vol., 1 pam.
Virginia-Geol. Survey. 1 vol.
Virginia, Univ. of. 1 vol.
Ward, C. D. 2 vol.
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Winchester, Mass.-Town Clerk. 1 vol.
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BY PURCHASE

The Engineering Index Annual for 1913. Compiled from the Engineering Index Published Monthly in the *Engineering Magazine* during 1913. The Engineering Magazine Co., New York, 1914.

The American Year Book: A Record of Events and Progress, 1913. Edited by Francis G. Wickware. D. Appleton and Company, New York and London, 1914.

Mitteilungen über Forschungsarbeiten auf dem Gebiete des Ingenieurwesens. Herausgegeben vom Verein deutscher Ingenieure. Heft 145. Julius Springer, Berlin, 1913.

Reports and Orders of the Public Service Commission of the State of New Hampshire for the period ending August 31st, 1913. Vol. 3. New Hampshire Public Service Commission.

Electrical Engineering: The Theory and Characteristics of Electrical Circuits and Machinery. By Clarence V. Christie. McGraw-Hill Book Company, Inc., New York and London, 1913.

Transformer Practice: Manufacture, Assembling, Connections, Operation and Testing. By William T. Taylor. Second Edition, Enlarged and Reset. McGraw-Hill Book Company, Inc., New York and London, 1913.

Mechanical Refrigeration: A Treatise for Technical Students and Engineers. By H. J. Macintire. John Wiley & Sons, Inc., New York; Chapman & Hall, Limited, London, 1914.

A Text-Book on the Method of Least Squares. By Mansfield Merriman, M. Am. Soc. C. E. Eighth Edition, Revised. John Wiley & Sons, Inc., New York; Chapman & Hall, Limited, London, 1913.

Government Ownership of Railways. By Samuel O. Dunn. D. Appleton & Company, New York and London, 1913.

Railway Gazette: A Journal of Transportation Engineering, Docks, Harbours, Contracts and Railway News. Vol. 15-16, July, 1911–June, 1912. London, 1912.

The Sampling and Assay of the Precious Metals; Comprising Gold, Silver, Platinum, and the Platinum Group Metals in Ores, Bullion, and Products. By Ernest A. Smith. J. B. Lippincott Co., Philadelphia; Charles Griffin & Co., Ltd., London, 1913.

Cyclopedia of Civil Engineering: A General Reference Work on Surveying, Railroad Engineering, Structural Engineering, Roofs and Bridges, Masonry and Reinforced Concrete, Highway Construction, Hydraulic Engineering, Irrigation, River and Harbor Improvement, Municipal Engineering, Cost Analysis, Etc. Edited by Frederick E. Turneaure, M. Am. Soc. C. E., Assisted by a Corps of Civil and Consulting Engineers and Technical Experts of the Highest Professional Standing. 8 Vol. American Technical Society, Chicago, 1913.

SUMMARY OF ACCESSIONS

(From February 3d to March 2d, 1914)

Donations (including 20 duplicates)	254
By purchase	20
Total	274

MEMBERSHIP

ADDITIONS

(From February 6th to March 5th, 1914)

MEMBERS		Date of Membership.
ALEXANDER, HENRY DAVID. Special Res. Engr., New York State Barge Canal, Barge Canal Office, Albany, N. Y.		Feb. 4, 1914
ALLEN, THOMAS WARREN. Senior Highway Engr., Office of Public Roads, The Kenesaw, Washington, D. C.		Feb. 4, 1914
BAYLEY, EDGAR ALCANDER. Asst. Engr., Dept. of Public Service, City of Los Angeles, 645 South Olive St., Los Angeles, Cal.		Dec. 31, 1913
BAYLIS, ARTHUR RAYMOND. Chf. Draftsman, 59th St. Power House, I. R. T. Co. and New York Rys. Co., 600 West 59th St., New York City.	Assoc. M. M.	June 6, 1906 Feb. 4, 1914
BENHAM, WEBSTER LANCE. Cons. and Superv. Engr.; Chf. Engr., The Benham Eng. Co., 435 Am. National Bank Bldg., Oklahoma, Okla.	Assoc. M. M.	April 5, 1910 Feb. 4, 1914
BENNETT, CHARLES JOSEPH. State Highway Commr., State Capitol, Hartford, Conn.		Feb. 4, 1914
BOOZ, HORACE COREY. Asst. Chf. Engr., P. R. R., Room 613, Broad St. Station, Philadelphia, Pa.	Assoc. M. M.	April 4, 1906 Feb. 4, 1914
BOUILLON, ARTHUR MAXIMILLIEN. Dist. Engr., G. T. P. Ry., P. O. Box 55, Quebec, Que., Canada.	Assoc. M. M.	June 6, 1911 Feb. 4, 1914
CULGIN, GUY WHITMORE. Asst. Engr., Bureau of Bldgs., Borough of Manhattan, Municipal Bldg. (Res., 410 West 148th St.), New York City.	Jun. Assoc. M. M.	Mar. 6, 1900 Sept. 7, 1904 Feb. 4, 1914
GEARHART, WALTER SCOTT. State Engr., Kansas State Agri. Coll., Manhattan, Kans.	Assoc. M. M.	June 3, 1908 Feb. 4, 1914
GRAVELLE, ALVIN. Asst. Bridge Engr., City of Cleveland, 411 City Hall, Cleveland, Ohio.	Assoc. M. M.	Nov. 6, 1901 Feb. 4, 1914
GUERINGER, LOUIS AMEDEE. Constr. Engr., Frisco Lines; County Engr., Victoria County, Victoria, Tex.	Assoc. M. M.	May 7, 1902 Feb. 4, 1914
HAYDON, GEORGE CONDIT. U. S. Asst. Engr., Missouri River Impvt., 707 Postal Bldg., Kansas City, Mo.		Feb. 4, 1914
MACALLUM, ANDREW FULLERTON. City Engr., Hamilton, Ont., Canada.		Feb. 4, 1914
MARANI, VIRGIL GEORGE. Cons. Engr., 702 The 1900 Euclid Bldg., Cleveland, Ohio.		Feb. 4, 1914

MEMBERS (*Continued*)

		Date of Membership.
NASH, FRANKLYN DANA. Room 408, Merchants National Bank Bldg., Vicksburg, Miss.	Assoc. M.	May 4, 1909
	M.	Feb. 4, 1914
SATTLEY, ROBERT CARLOS. Valuation Engr., Rock Island Lines, Room 1127, La Salle St. Station, Chicago, Ill.		Sept. 3, 1913
SCHUSSLER, HERMANN FREDERICK AUGUST. Civ., Mech. and Hydr. Engr., Room 618, Nevada Bank Bldg., San Francisco, Cal.		Feb. 4, 1914
SPIKER, JACOB STEPHEN. Cons. Civ. and San. Engr., Court House, Vincennes, Ind.		Feb. 4, 1914
STORRS, JOHN WILLIAMS. Cons. Engr., Concord, N. H.		Feb. 4, 1914

ASSOCIATE MEMBERS

BAILEY, THOMAS SHERWOOD. Asst. Engr., Dept. of State Engr. and Surv., 2 Cornelius Ave., Schenectady, N. Y.	Jun.	Feb. 28, 1911
	Assoc. M.	Feb. 4, 1914
BARKER, BERTRAND DON. Supt. of Constr., George A. Quinlan, 6200 Ellis Ave., Chicago, Ill.		Sept. 3, 1913
BOERS, OTTO WILLIAM. With The San. Dist. of Chicago, Chillicothe, Ill.		Feb. 4, 1914
BROWN, CHARLES BARTO. Prof. of Railroad Eng., Univ. of Maine, P. O. Box 162, Orono, Me.		Feb. 4, 1914
BURKHOLDER, JOSEPH L. Asst. Engr., U. S. Reclamation Service, 18th and Arthur St., Caldwell, Idaho.		Sept. 3, 1913
CANTWELL, HERBERT HERLUIN, Res. Engr., J. P. Brownell, 74 Glenwood Ave., Yonkers, N. Y.	Jun.	Dec. 3, 1907
	Assoc. M.	Feb. 4, 1914
CRAWFORD, WILLIAM HARRISON. Designing and Constr. Engr., Operating Dept., Am. Pipe & Constr. Co., 112 North Broad St., Philadelphia, Pa.		Feb. 4, 1914
DEXTER, CHARLES EDWIN. Care, George A. Fuller Co., 38 Taylor Arcade, Cleveland, Ohio.		June 4, 1913
DODGE, RALPH EMERSON. Office Engr., California Highway Comm., Forum Bldg., Sacramento, Cal.		Nov. 12, 1913
ELLIOTT, ALLEN EDRICK. Asst. Engr., B. & L. E. R. R., Greenville, Pa.		Feb. 4, 1914
FIELD, CLESSON HERBERT. Asst. Structural Engr., Lackawanna Steel Co. (Res., 223 Loring Ave.), Buffalo, N. Y.	Jun.	June 1, 1909
	Assoc. M.	Nov. 12, 1913
FITZPATRICK, FRANCIS JAMES. With Isthmian Canal Comm., Corozal, Canal Zone, Panama.		Oct. 1, 1913
FRY, HOWELL LEWIS. Engr. of Constr., Brazil Ry., Caixa Postal 565, São Paulo, Brazil.		Dec. 31, 1913
HARTWELL, OLIVER WHITCOMB. Office Engr., U. S. Geological Survey, 18 Federal Bldg., Albany, N. Y.		Feb. 4, 1914

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
HOWE, LYMAN STANLEY. Civ., Min. and Structural Engr. (Boyle Bros. & Howe), 61 West Union St., Wilkes-Barre, Pa		Oct. 1, 1913
JOHNSON, THEODORE SEDGWICK. Prof. of Civ. Eng., Denison Univ., Box 687, Granville, Ohio	Jun.	Jan. 2, 1912
	Assoc. M.	Dec. 31, 1913
KENDALL, FRANK B. Care, Toronto Harbor Commrs., Toronto, Ont., Canada		Feb. 4, 1914
KITTREDGE, RAYMOND BROWN. Asst. Prof. of Railroad Eng., State Univ. of Iowa, 904 Bowery St., Iowa City, Iowa		Feb. 4, 1914
KUHL, HERMAN CHARLES. Care, U. S. Reclamation Service, Gilman, Mont		Sept. 3, 1913
MARTIN, JAMES WALTER. Junior Engr., U. S. Engr. Office, Georgetown, S. C		Feb. 4, 1914
MERIWETHER, BENJAMIN BALDWIN. Engr., Birmingham Realty Co., 2118 First Ave., Birmingham, Ala		Feb. 4, 1914
OLMSTED, HERBERT WARNER. Asst. Engr., Board of Water Supply, City of New York, Pleasantville, N. Y		Dec. 31, 1913
OLDS, ROBERT FRANKLIN. Gen. Supt. of Constr., for Constr. Quartermaster, Fort Mills, Philippine Islands		Nov. 12, 1913
PHILIPS, GEORGE WASHINGTON. Res. Engr., New York Connecting R. R., 462 Amity St., Flushing, N. Y		Feb. 4, 1914
PHILLIPS, JAMES VERNON. Drainage Engr., U. S. Dept. of Agriculture, Savannah, Ga	Jun.	Feb. 6, 1912
	Assoc. M.	Nov. 12, 1913
RAY, NORMAN GILMAN. Engr. in Chg., Field Parties, Aluminum Co. of America, P. O. Box 297, Massena, N. Y		Oct. 1, 1913
SACHSE, RICHARD. Prin. Asst. Engr., California Railroad Comm., 1526 Grant St., Berkeley, Cal		Nov. 12, 1913
SCHNECK, EMIL MUNGER. Cons. Engr., 288 Main St., Greenfield, Mass		Dec. 31, 1913
SMITH, HARRISON. Prin. Asst. Engr., Alabama Power Co., Clanton, Ala		Feb. 4, 1914
SMITH, WALTER LYNES. Engr., Office of Engr. of Bridges, Penn. Lines W. of Pitts., Shafer Pl., Ben Avon, Pa		Feb. 4, 1914
SPRAGUE, EDWIN LORING, JR. Asst. Engr., Board of Water Supply of New York City, Valhalla, N. Y	Jun.	May 31, 1904
	Assoc. M.	Feb. 4, 1914
TOMLINES, THOMAS LEOPOLD. Cons. Industrial Engr., Stebbins Eng. & Mfg. Co., 335 Winslow St., Watertown, N. Y		Feb. 4, 1914
TOWLE, FOSTER. Asst. Engr., U. S. Reclamation Service, St. Ignatius, Mont	Jun.	Oct. 30, 1906
	Assoc. M.	Feb. 4, 1914

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership.
TREFETHEN, ERNEST MILTON. Asst. Engr., State Highway Comm., 53 Lancaster St., Albany, N. Y.	Feb. 4, 1914
WHIPPLE, ROBERT HOADLEY. Engr., Am. Gas Co., West Washington Sq., Philadelphia, Pa.	Feb. 4, 1914
YOUNG, FREDERICK CHARLES. Instr. in Civ. Eng., Coll. of Applied Science, State Univ. of Iowa, Iowa City, Iowa.	Feb. 4, 1914

JUNIORS

AYRES, QUINCY CLAUDE. Draftsman, Otter Bayou Drainage Dist., P. O. Box 94, Greenville, Miss.	Feb. 4, 1914
CADENAS, JOSÉ MANUEL. Industria 62, Havana, Cuba.	Dec. 3, 1913
CHAPMAN, ASA B. Care, D. Schultz, Care, Gunn Supply Co., 947 First St., Los Angeles, Cal.	Nov. 12, 1913
CROLL, HERBERT GREISS. Asst. Chf. Draftsman, Canada Foundry Co. of Toronto, 245 Margueretta St., Toronto, Ont., Canada.	Nov. 12, 1913
DARVILLE, MERTON ARTHUR. Junior Engr., Public Service Comm., First Dist., 549 Decatur St., Brooklyn, N. Y.	Feb. 4, 1914
DE CHARMS, RICHARD, JR. Asst. Engr., Glynn County Constr. Co., Darien, Ga.	Feb. 4, 1914
FAIRBANKS, HARRY JOHN. 111 Twelfth St., Troy, N. Y.	Feb. 4, 1914
HINDS, ARTHUR KLOCK. 813 Franklin St., Watertown, N. Y.	Nov. 12, 1913
MANNING, WILLIAM JAMES HENRY. Asst. to Office Engr., Delaware & Hudson R. R., 762 Madison Ave., Albany, N. Y.	Feb. 4, 1914
MORGAN, JOSEPH HOLLOWAY. 979 Anderson Ave., New York City.	Feb. 4, 1914
MUNN, HARVEY TIMLOW. Westford, Pa.	Dec. 31, 1913
NEUMAN, DAVID LEONARD. Asst. Engr., with Maurice Deutsch, 50 Church St. (Res., 518 West 143d St.), New York City.	Feb. 4, 1914
NEWKIRK, SAMUEL FRANK. Engr., Mercer Iron & Coal Co., Stoneboro, Pa.	Feb. 4, 1914
NOWLIN, ROBERT ALDRIDGE. Civ. and Min. Engr., Care, Shawnee Coal & Coke Co., Eckman, W. Va.	Feb. 4, 1914
PLUMMER, ALEC ALFRED. Civ. Engr. and Gen. Contr. (Marshall, Plummer & Co.), Suite 9, Gilford Court, Vancouver, B. C., Canada.	April 2, 1913
ROMANOWITZ, CHARLES MILLICHAMP. Eng. Asst. to Vice-Pres. and Gen. Mgr., Natomas Consolidated of California, 1808 Eighth St., Alameda, Cal.	Dec. 3, 1913
SADLER, WALTER CLIFFORD. 136 South Porter St., Elgin, Ill.	Feb. 4, 1914
SHERWOOD, WAKEMAN FRANCIS. Draftsman, Am. Bridge Co., 380 West Gray St., Elmira, N. Y.	Oct. 1, 1913

JUNIORS (*Continued*)

	Date of Membership.
TEN HAGEN, HENRY. 759 East Ave., Rochester, N. Y.....	Feb. 4, 1914
WELLES, THEODORE LADD, JR. 385 River St., Kingston, Pa.....	Feb. 4, 1914

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WILSON, WILLIAM RENFREW. Dist. Engr., Canton-Hankow Ry., Heng Chou Fu, China.

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JUNIORS

ACKHART, ANDREW LEWIS. 611 Jarvis St., Toronto, Ont., Canada.

ARMSTRONG, GEORGE SIMPSON, JR. Care, Miller Franklin & Co., Everett Chambers, Oak St., Portland, Me.

BARKER, JAMES MADISON. Instr. in Civ. Eng., Mass. Inst., Tech., Boston, Mass.

BARTLETT, WILLIAM ANDREWS. 100 Main St., Torrington, Conn.

BLIGHT, ARTHUR FREDERICK. Care, Pacific Light & Power Corporation, 624 Pacific Elec. Bldg., Los Angeles, Cal.

BOWMAN, RALPH MCLANE. Asst. Engr., L. E. & West. R. R., Care, Chf. Engr., Indianapolis, Ind.

BRINKERHOFF, GEORGE LOCKWOOD. Care, Isthmian Canal Comm., First Div. Office, Culebra, Canal Zone, Panama.

DAVILA, LORENZO JUAN. Asst. Engr., Porto Rico Irrig. Service, Juana Diaz, Porto Rico.

DIMMLER, CHARLES LOUIS. 5335 Locksley Ave., Oakland, Cal.

GARVEY, VICTOR HUGO. Contr. and Engr. (Jarvis & Garvey), 7633 Bagley Ave., Seattle, Wash.

GOWEN, JOHN FELLOWS. Box 342, Ossining, N. Y.

GRAY, HAROLD FARNSWORTH. Health Officer, 208 Ramona Bldg., Palo Alto, Cal.

HELLING, HARRY ALBERTUS. Asst. Engr., State Highway Dept., Binghamton, N. Y.

HORWEGE, ALVIN ARTHUR. 2847 Garber St., Berkeley, Cal.

JONES, CHARLES HYLAND. Superv., Erie R. R., Deposit, N. Y.

MACK, GEORGE HORACE. Lock Box 753, Hampton, Iowa.

MCGEE, HAROLD GILBERT. Care, State Board of Health, Ohio State Univ., Columbus, Ohio.

MARKS, EDWIN HALL. First Lieut., Corps of Engrs., U. S. A., Agaña, Island of Guam, Mariana Islands.

MILLER, HAROLD EDMUND. Box 403, Millville, Mass.

MONK, PERCY SHELLEY. Draftsman, L. I. R. R., 9 Buckingham Rd., Brooklyn, N. Y.

MONROE, ROBERT ANSLEY. 1016 Eddy St., San Francisco, Cal.

PARSONS, MAURICE GIESY. Prin. Asst. Engr., Compañia Constructora Richardson, S. A., 910 South Madison Ave., Pasadena, Cal.

PORZELIUS, ALBERT FREDERICK. Box 1103, Pittsburgh, Pa.

RANDELL, RALPH REGINALD. Junior Engr., U. S. Forest Service, Washington, D. C.

READ, BILL. Civ. and Min. Engr. (Halcombe, Flanders & Read), 641 Phelan Bldg., San Francisco, Cal.

JUNIORS (*Continued*)

SMALLMAN, RALPH ALCORN. Secy., Carroll Blake Constr. Co., 1617 Am. Trust Bldg., Birmingham, Ala.

STEINHAUSER, HARRY HERMAN. 546 West 124th St., New York City.

STEWART, JAMES ROBERT. With The Kansas City Terminal Ry., in Chg. of Party Work, 4140 Euclid Ave., Kansas City, Mo.

STIRLING, VINCENT REYNOLDS. Chf. Engr., Mindanao and Sulu, Zamboanga, Philippine Islands.

RESIGNATIONS

ASSOCIATE MEMBERS	Date of Resignation.
ADELHEIM, WILLIAM THOMAS	Feb. 4, 1914
COX, CHARLES BARROWS	Feb. 4, 1914
HOLTSMARK, ERLING	Feb. 4, 1914
SEARS, ROBERT HUMPHRY	Feb. 4, 1914
SOUTHER, THEODORE WHEELER	Feb. 4, 1914
JUNIORS	
BARNES, HARRY EVERETT	Feb. 4, 1914
JONES, WILLIAM HENRY	Feb. 4, 1914

DEATHS

GAZLAY, WEBSTER. Elected Member, June 7th, 1905; died February 17th, 1914.

MELVIN, DAVID NEILSON. Elected Member, July 3d, 1878; died January 27th, 1914.

Total Membership of the Society, March 5th, 1914, 7 335.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(February 2d to March 1st, 1914)

NOTE.—*This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

(1) *Journal*, Assoc. Eng. Soc., St. Louis, Mo., 30c.
(2) *Proceedings*, Engrs. Club of Phila., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Chicago, Ill., 50c.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Gesundheits Ingenieur*, München, Germany.
(8) *Stevens Institute Indicator*, Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *Engineering Record*, New York City, 10c.
(15) *Railway Age Gazette*, New York City, 15c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Electric Railway Journal*, New York City, 10c.
(18) *Railway Review*, Chicago, Ill., 15c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 20c.
(21) *Railway Engineer*, London, England, 1s. 2d.
(22) *Iron and Coal Trades Review*, London, England, 6d.
(23) *Railway Gazette*, London, England, 6d.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *Railway Age Gazette, Mechanical Edition*, New York City, 20c.
(26) *Electrical Review*, London, England, 4d.
(27) *Electrical World*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, Mass., $1.
(29) *Journal*, Royal Society of Arts, London, England, 6d.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium, 4 fr.
(31) *Annales* de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand, Brussels, Belgium, 4 fr.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France, 1 fr.
(34) *Portefeuille Economiques des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *Cornell Civil Engineer*, Ithaca, N. Y.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Technisches Gemeindeblatt*, Berlin, Germany, 0, 70m.
(40) *Zentralblatt der Bauverwaltung*, Berlin, Germany, 60 pfg.
(41) *Electrotechnische Zeitschrift*, Berlin, Germany.
(42) *Proceedings*, Am. Inst. Elec. Engrs., New York City, $1.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governors Island, New York Harbor, 50c.
(45) *Colliery Engineer*, Scranton, Pa., 25c.
(46) *Scientific American*, New York City, 15c.
(47) *Mechanical Engineer*, Manchester, England, 3d.
(48) *Zeitschrift*, Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.
(49) *Zeitschrift für Bauwesen*, Berlin, Germany.
(50) *Stahl und Eisen*, Düsseldorf, Germany.
(51) *Deutsche Bauzeitung*, Berlin, Germany.
(52) *Rigasche Industrie Zeitung*, Riga, Russia, 25 kop.
(53) *Zeitschrift*, Oesterreichischer Ingenieur und Architekten Vereines, Vienna, Austria, 70h.

(54) *Transactions*, Am. Soc. C. E., New York City, $12.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $6.
(57) *Colliery Guardian*, London, England, 5d.
(58) *Proceedings*, Engrs.' Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
(59) *Proceedings*, American Water-Works Assoc., Troy, N. Y.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *Industrial World*, 59 Ninth St., Pittsburgh, Pa., 10c.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 5c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 6d.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England, 6d.
(69) *Der Eisenbau*, Leipzig, Germany.
(71) *Journal*, Iron and Steel Inst., London, England.
(71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
(72) *American Machinist*, New York City, 15c.
(73) *Electrician*, London, England, 18c.
(74) *Transactions*, Inst. of Min. and Metal., London, England.
(75) *Proceedings*, Inst. of Mech. Engrs., London, England.
(76) *Brick*, Chicago, Ill., 10c.
(77) *Journal*, Inst. Elec. Engrs., London, England, 5s.
(78) *Beton und Eisen*, Vienna, Austria, 1, 50m.
(79) *Forscherarbeiten*, Vienna, Austria.
(80) *Tonindustrie Zeitung*, Berlin, Germany.
(81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
(82) *Mining and Engineering World*, Chicago, Ill., 10c.
(83) *Gas Age*, New York City, 15c.
(84) *Le Ciment*, Paris, France.
(85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.
(86) *Engineering-Contracting*, Chicago, Ill., 10c.
(87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.
(88) *Bulletin* of the International Ry. Congress Assoc., Brussels, Belgium.
(89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., $5.
(90) *Transactions*, Inst. of Naval Archts., London, England.
(91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
(92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
(93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
(94) *The Boiler Maker*, New York City, 10c.
(95) *International Marine Engineering*, New York City, 20c.
(96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
(98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.
(99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, $2.
(100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.
(101) *Metal Worker*, New York City, 10c.
(102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
(103) *Mining and Scientific Press*, San Francisco, Cal., 10c.
(104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
(105) *Metallurgical and Chemical Engineering*, New York City, 25c.
(106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.
(107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
(108) *Southern Machinery*, Atlanta, Ga., 10c.
(109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.
(110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.
(111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.

LIST OF ARTICLES

Bridges.

The Fall River Bridge.* James W. Rollins. (109) Feb.
Frankignoul Enlarged-Base Reinforced Concrete Piles.* Frankignoul. (Paper read before the Belgian State Railways.) (21) Feb.
Bay City Bridge, G. T. Ry.* (87) Feb.
Concrete Practice No. 10, Philadelphia & Reading Ry. (Bridges and Culverts).* A. M. Wolf. (87) Feb.
The Crooked River Arch.* C. E. Chase. (19) Feb. 7.
Design and Construction of the Bush and Gunpowder River Bridges Consisting of a Series of Reinforced Concrete Slab Spans.* (86) Feb. 11.
Specifications for Unit Stress in End Posts of Railroad Bridges. Albert Smith. (Paper read before the Indiana Eng. Soc.) (86) Feb. 11.

*Illustrated.

Bridges—(Continued).

Design Features of the Reinforced Concrete Viaduct on Hopple St., Cincinnati, Ohio.* (86) Serial beginning Feb. 11.
The Rusting of Steel Bridges.* Clifford Older. (Abstract of paper read before the Ill. Soc. of Engrs. and Surveyors.) (13) Feb. 12.
Design and Cost of Ornamental Arch Bridges in Los Angeles.* R. W. Stewart. (14) Feb. 14.
Schuylkill River Railroad Bridge.* (14) Feb. 14.
Standard Concrete Piles for Bridge Foundation, Adopted by Chicago, Burlington & Quincy Railroad. (14) Feb. 14.
Reinforced-Concrete Columns for Bridge over St. Croix River at Hudson, Wisconsin.* (14) Feb. 14.
Bridge over Burrard Inlet at Second Narrows, Vancouver, B. C.; Record-Breaking Swing-Span.* (13) Feb. 19.
Erecting a Long Steel Girder Span for the Duluth, South Shore & Atlantic near Shilo, Wis.* (15) Feb. 20.
Report of Creosoted Piling in Santa Fé Galveston Bay Bridge.* F. B. Ridgway. (Paper read before the Am. Wood Preservers' Assoc.) (15) Feb. 20.
Building a Concrete Bridge in Halves.* (14) Feb. 21.
Separation of Grade Crossings at Chattanooga, Tenn., McCallie Avenue Viaduct.* (18) Feb. 21.
Interchanging Two Bridge Spans, Wabash R. R. Bridge at Hannibal, Mo.* F. W. Curtis. (13) Feb. 26.
Recommendations for Reinforced-Concrete Highway Bridges and Culverts. (Report of Comm. to Am. Concrete Inst.) (13) Feb. 26.
Steel Highway Bridge Failure.* N. B. Garver. (14) Feb. 28.
Le Pont en Arc de Hell Gate sur l'East River à New-York.* P. Calfas. (33) Jan. 31.
Viaducs en Béton Armé du Grundjetobel et de Langwies sur la Ligne de Coire à Arosa (Grisons, Suisse).* A. Bidault des Chaumes. (33) Feb. 7.
Abriss einer allgemeinen Theorie des eingespannten Trägers mit räumlich gewundener Mittellinie.* H. Marcus. (49) Pt. 1.
Der Einfluss der Längs- und Querkräfte auf statisch unbestimmte Bogen- und Rahmentragwerke.* R. Rueb. (79) Vol. 22.
Der Neubau der Draubrücke in Marburg.* Anton Hochsinger. (40) Nov. 22.
Der Betrieb der Brückenwehre im Mohawk-Flusse.* D. A. Watt. (48) Jan. 17.
Provinzialstrassenbrücke Mestre-Mirano (Italien).* Theodor Gesteschi. (78) Jan. 20.
Die neue Strassenbrücke über die Spree in Fürstenwalde.* Karl Bernhard. (51) Serial beginning Feb. 4.
Viktoriabrücke in Bromberg.* Lewe. (80) Feb. 5.

Electrical.

Overhead Wire Construction for Medium and Low Pressures.* A. P. Trotter. (Paper read before the Institution of Post-Office Elec. Engrs.) (26) Jan. 23.
Protective Reactances in Large Power Stations.* James Lyman, Allen M. Rossman and Leslie L. Perry. (42) Feb.
Outdoor *vs.* Indoor Substations. Alexander Macomber. (42) Feb.
Indoor and Outdoor Substations in Pennsylvania.* H. L. Fullerton. (42) Feb.
Outdoor Substations in New England. Fred L. Hunt. (42) Feb.
Outdoor Substations in the Middle West.* Leslie L. Perry. (42) Feb.
Problems of High-Tension Transmission Lines. P. W. Sothman. (42) Feb.
Practical Operation of Suspension Insulators.* H. W. Buck. (42) Feb.
Distribution of Electrical Energy. P. Junkersfeld. (42) Feb.
Effect of Electrical Engineering on Modern Industry. Charles P. Steinmetz. (3) Feb.
The Skin Effect and Alternating-Current Resistance.* Edwin F. Northrup and John R. Carson. (3) Feb.
On a Variable Condenser with a Square Law.* W. Duddell. (77) Feb. 2.
The Theory of the Three-Phase Synchronous Machine.* T. F. Wall. (77) Feb. 2.
Some Phases of the Illumination of Interiors.* Preston S. Millar. (Paper read before the Am. Gas Inst. and Illuminating Eng. Soc.) (24) Feb. 2.
Reactance and Reactance Coils in Power Circuits.* E. P. Hollis. (77) Feb. 2.
Electric Train-Lighting Systems.* T. Ferguson. (77) Feb. 2.
A New Electric Carrier for the Transportation of Mails.* (12) Feb. 6.
Recent Developments in Electricity Supply in Hull.* (26) Serial beginning Feb. 6.
Electric Headlights. J. G. Scrugham. (111) Feb. 7.
Steel Bars or Rails as a Current-Carrying Medium in Mill Haulage.* G. E. Gunning. (62) Feb. 9.
Speed Control of Electric Motors.* (57) Feb. 13.
Testing Reinforced Concrete Poles.* (14) Feb. 14.
Recent Developments in Constant-Current Transmission.* Louis Bell. (27) Feb. 14.
Safety Regulations for Electric Power Companies. W. K. Freudenberger. (111) Feb. 14.
Suggested Methods of Improving the Telephone Service.* W. Aitken. (77) Feb. 16.

*Illustrated.

Electrical—(Continued).

A Cœur D'Alene Electric Plant. Girard B. Rosenblatt. (103) Feb. 21.
Union Central Life Building, Cincinnati (Electrical Features).* (27) Feb. 21.
Resonance in Radiotelegraphy.* J. Hettinger. (27) Serial beginning Feb. 21.
A Regulation Chart for 50-Cycle Lines.* H. B. Dwight. (111) Feb. 21.
Elektrizitätsversorgung der Grossstädte. G. Klingenberg. (41) Serial beginning Jan. 22.
Das Tonrad als Detektor in der drahtlosen Telegraphie.* Rudolf Goldschmidt. (41) Jan. 22.
Ein neuer Drehstrom-Kommutator mit Nebenschlussregulierung durch Bürstenverschiebung.* H. K. Schrage. (41) Jan. 22.
Die Entwicklung des Telegraphenbetriebes auf den grossen unterirdischen Linien Deutschlands.* Otto Arendt. (41) Jan. 22.
Methode zur Ermittlung der Senkregulierwiderstände bei Hubwerken mit elektrischer Senkbremsung.* Ernst Schwarz. (41) Jan. 29.
Rechnerische Ermittlung der sparsamsten Beleuchtung für einen gegebenen Lichtbedarf.* H. v. Glinski. (41) Jan. 29.
Zur Theorie des Saitengalvanometers.* Rudolf Förster. (41) Feb. 5.
Grosse amerikanische Drehstrom-Turbo-Dynamos.* Robert Pohl. (41) Feb. 12.
Ueber Einschaltvorgänge und elektrische Wanderwellen.* Ludwig Binder. (41) Serial beginning Feb. 12.

Marine.

The Manufacture of Armour-Piercing Projectiles.* Leandro Cubillo. (71) Vol. 88.
The Use of Special Steel in Warships.* Hiraga. (Paper read before the Japanese Inst. of Naval Archts.) (11) Feb. 6.
Three-Masted Schooner *Aosta* with Savoia Diesel Marine Engines.* (11) Feb. 6.
The Car Ferry in Freight and Passenger Service.* Harry Chapin Plummer. (19) Feb. 7.
Les Nouveaux Remorqueurs de Rhone de la Cie. Lyonnaise de Navigation et de Remorquage.* A. Dumas. (33) Jan. 31.
Schleuse und Trockendock bei Keokuk, Iowa.* Eger. (40) Jan. 21.

Mechanical.

The Manufacture of Coke in Belgium.* Evence Coppée. (71) Vol. 88.
The Wolseley Motor-Car Works Extensions.* (11) Jan. 23.
Eddies in Gaseous Fluids.* J. G. Clark. (Paper read before the London and Southern District Junior Gas Assoc.) (66) Jan. 27.
Pneumatic Tools.* H. I. Brackenbury. (Paper read before the Coventry Eng. Soc.) (11) Jan. 30.
The Green Aeroplane Engine.* (11) Jan. 30.
The Prudhon Combined Cylindrical and Water-Tube Boiler.* (11) Jan. 30.
The Resistance of Bars, Struts, and Wires in a Current of Air.* A. P. Thurston. (11) Jan. 30.
Modern Gearing.* H. Hubert Thorne. (Abstract of paper read before the Junior Institution of Engrs.) (47) Jan. 30.
Power Production in the United Kingdom.* Edward G. Hiller. (Paper read before the Manchester Assoc. of Engrs.) (47) Serial beginning Jan. 30; (22) Jan. 30; (57) Feb. 6.
The Present Status of the Wood Turpentine Industry. E. H. French and James R. Withrow. (Paper read before the Am. Inst. of Chemical Engrs.) (105) Feb.
Basic Coke. J. R. Campbell. (Paper read before the Coal Min. Inst. of America.) (45) Feb.
The Briquet for Saving Fuel Waste.* Day Allen Willey. (45) Feb.
Powdered Fuel for Railway Shops.* J. G. Contant. (25) Feb.
Recent Economies in the Sugar Industry.* Alfred L. Webre. (Paper read before the Louisiana Soc. of Engrs.) (1) Feb.
Oxy-Acetylene Cutting in Boiler Work.* C. E. Lester. (94) Feb.
Oxy-Acetylene Welding of Boilers.* Henry Cane. (94) Feb.
Olympic Cement Plant, Bellingham, Washington.* (67) Feb.
Mechanical Refrigeration.* H. J. Macintire. (105) Serial beginning Feb.
Some Phases of the Illumination of Interiors.* Preston S. Millar. (Paper read before the Am. Gas Inst. and Illuminating Eng. Soc.) (24) Feb. 2.
Records of the Year in Smoke Abatement in the Cities of Pittsburgh, Chicago, Philadelphia, Baltimore, Cincinnati, Youngstown, Cleveland, Boston, and Milwaukee.* (62) Feb. 2.
The Economic Aspect of the Repair and Maintenance Section of a Gas-Works. F. R. Parsons. (66) Feb. 3.
Plant of Worcester Salt Co.* Charles H. Bromley. (64) Feb. 3.
Cost of Compressing Air by Electricity.* W. C. Lancaster. (64) Feb. 3.
Softening Boiler Feed Water. E. H. Robie. (64) Feb. 3.
Motor Fuels, with Special Reference to Alcohol. William Reginald Ormandy. (29) Feb. 6.

*Illustrated.

Mechanical—(Continued).

Ball Bearings.* David Martin. (Paper read before the Scientific Soc. of the Royal Technical College.) (47) Feb. 6.
Development of the Natural Gas Industry in California and the Building of California's First Large Natural Gas Line.* W. E. Barrett. (24) Feb. 9.
Large-Capacity Gas-Exhausters.* John Foster. (66) Feb. 10; (22) Feb. 13.
Notes on Electricity in Gas-Works. G. Herbert Haynes. (Paper read before the Manchester Junior Gas Assoc.) (66) Feb. 10.
An Experience in Distribution. William Wilson. (Paper read before the Scottish Junior Gas Assoc.) (66) Feb. 10.
Model Mixed-Flow Steam-Turbine Plant.* Warren O. Rogers. (64) Feb. 10.
Comparative Safe Loads for Ball and Roller Bearings.* A. Riebe. (72) Feb. 12.
Experiments in Pre-Heating Clays. Joseph Keele. (Abstract from *Memoir No. 25*, Canada Geol. Survey.) (96) Feb. 12.
Recent Developments in Driving Indian Textile Mills.* (11) Feb. 13.
Causes of Accidents with Airships. Enrico Forlanini. (Translated from *La Lettura.*) (11) Feb. 13.
Turbine Design. Gerald Stoney, M. Inst. C. E. (Abstract of paper read before the Univ. of Manchester.) (11) Feb. 13.
Recent Developments in Grinding Machines.* Thomas R. Shaw. (47) Feb. 13.
The Noise of Motor Traffic.* (12) Serial beginning Feb. 13.
The Properties and Uses of Oil. L. K. Hirshberg. (82) Feb. 14.
Catastrophic Inability in Aeroplanes.* T. W. Lancaster. (Paper read before the British Assoc.) (19) Feb. 14.
The Moving Picture in the Machine Tool Business.* Chester L. Lucas. (From *Machinery.*) (19) Feb. 14.
Report of Committee on Outdoor Lighting, National Commercial Gas Association.* A. H. Humphrey. (24) Feb. 16.
Making the Foundry Pay Dividends. Stuart Dean. (Paper read before the Pittsburgh Foundrymen's Assoc.) (62) Feb. 16.
The New Jersey Commission 90 Cent Gas Rate Order. (83) Feb. 16.
Proposed Regulations for Heating Value of Gas. (83) Feb. 16.
The Heating of Retort-Settings. David T. Marwick. (Paper read before the Scottish Junior Gas Assoc.) (66) Feb. 17.
The Use of Pulverized Coal as Fuel. W. S. Quigley. (Abstract of paper read before the Am. Foundrymen's Assoc.) (13) Feb. 19.
Pulverized Coal as a Fuel for Boilers. R. C. Carpenter. (Abstract from *Sibley Journal of Engineering.*) (13) Feb. 19.
Methods Used in Making the Daimler-Knight Engine.* I. W. Chubb. (72) Feb. 19.
An Unusual Concrete Pipe Plant at Auburn, Wash.* (15) Feb. 20.
The Wanamaker-Curtiss Transatlantic Biplane.* (46) Feb. 21.
The Experimental Laboratory of the Automobile Club of France.* Jacques Boyer. (19) Feb. 21.
Automatic and Distance Lighters.* Francis H. Gilpin. (Paper read before the Am. Gas Inst.) (24) Feb. 23.
Report of the Committee, Am. Gas Inst., on Power Economies in Gas Plants. (24) Serial beginning Feb. 23.
Economical Burning of Fuel. J. P. Greenwood. (Abstract of paper read before the Practical Refrigerating Engrs. Assoc.) (64) Feb. 24.
Wisconsin Steel Company's New Bar Mill.* (20) Feb. 26.
Développement de l'Aviation.* Rodolphe Soreau. (32) Dec.
Commission de l' Unification Internationale des Pas de Vis des Tuyaux, IV^e^ Session—17 et 18 novembre 1913.* (32) Dec.
Etat Actuel de la Liquéfaction de l'Air et de ses Applications. Georges Claude. (32) Dec.
Note sur la Compression des Gaz Réels. Henri Brot. (37) Dec. 31.
Théorie Mathématique des Machines à Air Liquide et la Détente des Gaz.* Henri Brot. (92) Jan.
Utilisation des Gaz Brûlés des Fours Tournants à la Production de la Vapeur. (84) Jan.
Exposé des Différentes Méthodes de Mesures de l'Energie Consommée par les Fours à Coke à Régénération de Chaleur; Méthode Nouvelle pour la Détermination Exacte de Cette Quantité de Chaleur.* E. Lecocq et J. Pieters. (93) Jan.
Les Récents Travaux du Laboratoire Cryogène de Leyde (Pays-Bas).* C. A. Crommelin. (33) Jan. 24.
Les Machines Frigorifiques à Compression et leurs Perfectionnements Récents.* Henri Brot. (37) Jan. 31.
La Recherche des Erreurs dans les Indicateurs Dynamométriques.* James G. Stewart et O.-H. Wildt. (37) Jan. 31.
Chaudières Multitubulaires, Système J. Van Oosterwyck.* (34) Serial beginning Feb.
Verdampfungsversuche von L. Weiss und das Verdampfungsgesetz für ortfeste Dampfkessel.* O. Köchy. (48) Dec. 27.
Rauchkammerlösche als Brennstoff für Dampfkessel.* O. Nerger. (48) Dec. 27.
Naphthalinbetrieb bei Motorfahrzeugen.* A. Heller. (48) Jan. 3.

*Illustrated.

Mechanical.—Continued.

Ball Bearings.* Trevis Burton. (Paper read before the Societe Ren. of the

Royal Technical College.* (47) Feb. 8.

Development of the Natural Gas Industry in California and the Drilling of Gas-

Engine Plant, Large Natural Gas Line.* W. E. Byrnes. (24) Feb. 8.

Large-Capacity Gas-Engine.* John Penn. (36) Feb. 10; (22) Feb. 19.

Machine Shop Economy.* (36) Feb. 17.

Notes on Electricity in Gas-Works. G. Herbert Rivas. (Paper read before the

Manchester Junior Gas Assoc.) (36) Feb. 17.

An Experience in Distribution. William Wilson. (Paper read before the Scottish

Junior Gas Assoc.) (69) Feb. 19.

Mixed Mixed-Flow Steam-Turbine Plant.* Warren O. Rogers. (41) Feb. 19.

Comparative Rate Loads for Half and Butler Heatings.* A. Hinde. (22) Feb. 12

Experiments in Pre-Heating Chaux. Joseph Kosle. (Abstract from Memoir No. 26,

Canada Geol. Survey.) (91) Feb. 12.

Recent Developments in Driving Indian Textile Mills.* (11) Feb. 12.

Causes of Accidents with Air-Brake. Bernd Poliandi. (Translated from Le Ge-

nie.) (11) Feb. 12.

Traffic Design. Oswald Moser. M. Inst. C. E. (Abstract of paper read before the

Univ. of Manchester.) (1) Feb. 12.

Recent Developments in Gasoline Motors.* Thomas H. Hoyt. (42) Feb. 12

The Value of Motor Trucks.* (12) Serial beginning Feb. 12.

The Properties and Uses of Oil. L. M. Hirshon. (82) Feb. 14.

Calorimetric Inability in Aeroplanes.* T. W. Lamarre. (Paper read before the

Mechan. Assoc.) (19) Feb. 14.

The Working Values in the Modern Gas Business.* Charles L. Lucas. (From

Memoirs.) (17) Feb. 14.

Report of Committee on Gasoline Lighting Nationl Commercial Gas Association.*

A. H. Hemphrey. (43) Feb. 14.

Testing the Records for Uniformity. Stuart Page. (Paper read before the Phila-

delphia Foundrymen's Assoc.) (62) Feb. 14.

The New Jersey Commission on Gas and the Rate Order. (83) Feb. 15.

Proposed Regulations for Heating Value of Gas. (83) Feb. 14.

The Heating of Iron-Boilers. David T. Marsing. (Paper read before the

Scottish Junior Gas Assoc.) (69) Feb. 17.

The Use of Pulverized Coal as Fuel. W. A. Gudgin. (Abstract of paper read before

the Am. Foundrymen's Assoc.) (43) Feb. 19.

Pulverized Coal as a Fuel for Boilers. H. C. Carpenter. (Abstract from Mining

Journal of Engineering.) (43) Feb. 19.

Methods Used in Making the Interior Finish Moulds.* W. Clubb. (72)

Feb. 19.

An Unusual Concrete Pipe Plant at Andrew, Wash.* (48) Feb. 20.

The Wanamaker-Curtis Transatlantic Biplane.* (48) Feb. 21.

The Experimental Laboratory of the Automobile Club of France. Jacques Moyer.

(19) Feb. 21.

Automatic and Dielectric Lighters.* Francis H. Gibjin. (Paper read before the

Am. Gas Inst.) (26) Feb. 20.

Report of the Committee, Am. Gas Inst., on Power Economics in Gas Plants. (24)

Serial beginning Feb. 23.

Economical Burning of Fuel. I. P. Greenwood. (Abstract of paper read before

the Practical Refrigerating Engrs. Assoc.) (44) Feb. 22.

Wisconsin Steel Company's New Mar Mill.* Dec.

Developpement de l'Aviation.* Rodolphe Soreau. (43) Dec.

Commission de l'Utilisation Industrielle de l'Or de Vis des Tuyaux 1Y' Sec-

tion.—If of is avenatre 1913.* (12) Dec.

Etat Actuel de la Liquefaction de l'Air et de ses Applications. Georges Claude.

(12) Dec.

Cole sur la Compression des Gaz Rebis. Henri Brul. (12) Dec. 31.

Theorie Mathematique des Machines à Air Liquide et la Donnée des Gaz.* Henri

Brot. (92) Jan.

Utilisation des Gaz Brûlés des Fours Tournants à la Production de la Vapeur.

(84) Jan.

Propos des Différents Méthodes de Mesure de l'Energie Consommée par les

Pours à Coke à Récuperation de Chaleur; Méthode Nouvelle pour la Détermina-

tion Exacte de Cette Quantité de Chaleur.* R. Lacout et J. Peters. (93) Jan.

Les Records Travaux du Laboratoire Crocodile de Lavde (Pas-de-Bas).* C. A. Com-

mells. (13) Jan. 24.

Les Machines Frigorifiques à Compression et leurs Perfectionnements Récents.*

Henri Brot. (12) Jan. 21.

La Recherche des Erreurs dans les Indicateurs Dynamométriques.* James G.

Stewart et O.-H. Wimbi. (12) Jan. 31.

Chaudières Matériaux, Système J. Van Oosterzyck.* (14) Serial beginning

Feb.

Verbrennungsversuche von L. Weiss und das Verdampfungsgesetz für ortliche

Dampfkessel.* O. Knoblr. (48) Dec. 27.

Maschinenanlagen als Brennstoff für Dampfkessel.* O. Neyer. (48) Dec. 27

Explosionsunfälle bei Motorfahrzeugen.* A. Heller. (48) Jan. 3.

Mechanical—(Continued).

Versuche über den Einfluss der Kompression und der Oberflächen, an denen sich der Wärmeaustausch im Dampfzylinder vollzieht, auf den Arbeitsvorgang einer Einzylinder-Maschine.* E. Heinrich. (48) Serial beginning Jan. 3.
Ueber neuere Roheisenmischer.*. Hubert Hermanns. (48) Jan. 10.
Die Messung der mechanischen Leistung durch elektrische Pendelmaschinen.* Langer und Finzi. (48) Jan. 10.
Die Instandhaltung der Sägeblätter der Holzbearbeitungsmaschinen.* John Schapiro. (52) Serial beginning Jan. 15.
Lokomotiv-Hebekrane.* Ernst Wülfrath. (48) Jan. 17.
Ortbewegliche elektro-hydraulische Nietmaschine, Bauart Spillmann.* H. Spillmann. (48) Serial beginning Jan. 17.
Untersuchungen an der Trocken-Gasreinigungsanlage auf der Halberger Hütte.* F. Mayer. (50) Feb. 5.
Stützen für Drahtseilbahnen aus Beton und Eisenbeton.* (102) Feb. 1.
Dampfturbinen und Turbodynamos der Maschinenfabrik Oerlikon.* H. Däschler. (41) Feb. 5.
Ueber Transformatorenöl.* W. Brauen. (41) Feb. 5.

Metallurgical.

On the Use of Oxygen in Blast-Furnace Practice. Gustave Trasenster. (71) Vol. 88.
A New Method for the Determination of the Critical Points Ar 1 Ac 1.* J. E. Stead. (71) Vol. 88.
On Modern Open-Hearth Steel Furnaces. Benjamin Talbot. (71) Vol. 88.
Heating and Cooling Curves of Manganese Steel. *Sir* Robert A. Hadfield. (71) Vol. 88.
The Distillation of Tar in Metallurgical Practice.* Gevers-Orban. (71) Vol. 88.
The Utilization of Blast-Furnace and Coke-Oven Gases in Metallurgy.* E. Houbaer. (71) Vol. 88.
The Crystallising Properties of Electro-Deposited Iron. J. E. Stead and H. C. H. Carpenter. (71) Vol. 88.
The Allotropic Transformations of Iron.* Albert Sauveur. (71) Vol. 88.
Historical Survey of the Metallurgy of Iron in Belgium. De Laveleye. (71) Vol. 88.
Reinforced Pile Foundations for Blast Furnaces.* Armand Baar. (71) Vol. 88.
Commercial Production of Sound Steel Ingots.* Emil Gathmann. (71) Vol. 88.
The Electric Refining of Steel in an Induction Furnace of Special Type.* Otto Frick. (71) Vol. 88.
The Effect of Heat Treatment on the Colorimetric Test for Carbon in a 0.32 Carbon Steel. Edward D. Campbell and Frank D. Haskins. (71) Vol. 88.
The Manufacture of Armour-Piercing Projectiles.* Leandro Cubillo. (71) Vol. 88.
Application of Clean Blast-Furnace Gas. D. Neustadter. (Paper read before the Cleveland Institution of Engrs.) (22) Jan. 23.
High-Temperature Resistivity of Refractories; a New Method of Measuring with Results for Alundum.* Edwin F. Northrup. (105) Feb.
Dry Chloridization of Ores.* John L. Malm. (105) Feb.; (82) Feb. 14.
Electric Iron Smelting at Hardanger in Norway.* Joh. Härden. (105) Feb.
Concentration of Carnotite by Wet and Dry Methods. (105) Feb.
Some Present-Day Metallurgical Problems. D. A. Lyon. (3) Feb.
The Works of the Alton Steel Company.* (20) Feb. 12.
The Globe Mine and Mill.* Wallace Macgregor. (103) Feb. 14.
Antimony; Its Ores, Metallurgy, and Uses. L. C. Mott. (Paper read before the Am. Chemical Soc.) (103) Feb. 14.
Copper Production of Great Cobar, Ltd.* C. A. Tupper. (82) Feb. 21.
Cyanide Plant of the Cornucopia Mine.* Paul W. Gaebelein. (16) Feb. 28.
Tube-Milling Practice. H. S. Gieser. (16) Feb. 28.

Military.

The Manufacture of Armour-Piercing Projectiles.* Leandro Cubillo. (71) Vol. 88.
La Métallurgie au Point de Vue de l'Artillerie.* L. Regnault. (32) Dec.
Les Types Récents de Canons de Montagne.* D. Duaner. (Abstract from *Revue d'Artillerie.*) (33) Jan. 24.

Mining.

Firedamp in Coal-Mines, and the Prevention of Explosions. John Harger. (Paper read before the Manchester Geol. and Min. Soc.) (106) Vol. 46, Pt. 2.
The Detection of Gob-Fires. John Harger. (Paper read before the Manchester Geol. and Min. Soc.) (106) Vol. 46, Pt. 2.
Notes on a New Process for the Washing of Coal at the St. Nicholas Pit of the Societe des Charbonnages de l'Esperance et Bonne Fortune, near Liege, Belgium. Leo Dorey Ford. (Paper read before the North of England Inst. of Min. and Mech. Engrs.) (106) Vol. 46, Pt. 2.

*Illustrated.

Mechanical—Continued.

Metallurgical.

Military.

Mining.

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*Illustrated.

Mining—(Continued).

The Effect of Increased Atmospheric Pressure on the Height of the Gas-Cap.* George A. Lodge. (Paper read before the Midland Inst. of Min., Civ. and Mech. Engrs.) (106) Vol. 46, Pt. 2.

An Account of the Use of Rescue-Apparatus at Lodge Mill Colliery, Huddersfield. W. D. Lloyd. (Paper read before the Midland Inst. of Min., Civ. and Mech. Engrs.) (106) Vol. 46, Pt. 2.

New Method of Making Large Arches in Mines.* John Roberts. (Paper read before the South Wales Inst. of Engrs.) (22) Jan. 23; (57) Jan. 30.

Spontaneous Combustion of Coal in Mines: Report of the Departmental Committee of the United Kingdom. (22) Jan. 30.

Unwatering Old Workings at Middleton Colliery.* Cecil Hinchliffe. (Paper read before the National Assoc. of Colliery Managers.) (22) Jan. 30.

Different Types of Skips Used at Butte.* Claude T. Rice. (82) Jan. 31.

Prevention of Dust and Gas Explosions. Geo. S. Rice. (82) Jan. 31.

The Kieselguhr Industry.* Percy A. Boeck. (105) Feb.

French Coal Dust Precautions.* Pol Dunaime. (45) Feb.

Hisylvania Mine No. 23.* Wilbur Greeley Burroughs. (45) Feb.

Mining at Lowe, West Virginia.* William Z. Price. (45) Feb.

The Effects of the Detonation of Gun-Cotton.* B. Hopkinson. (Paper read before the North-East Coast Institution of Engrs. and Shipbuilders.) (11) Feb. 6.

Mining the Iron-Ore Bodies of Cuba.* C. A. Tupper. (82) Feb. 7.

The Design of Gold Dredge Buckets.* George E. Sibbett. (16) Feb. 7.

Status and Plans of the Alaska Juneau Gold Mining Co.* Robert A. Kinzie. (16) Feb. 7.

Revision of the Mining Law, Discovery. William E. Colby. (103) Feb. 7.

Cylindrical Wooden Ore-Passes.* Andrew Fairweather. (Paper read before the Australasian Inst. of Min. Engrs.) (103) Feb. 7.

A Large Dredger for a Siamese Tin Field.* (12) Feb. 13.

Electric Pumping Plant at Tilmanstone Colliery.* H. J. Wroe. (Paper read before the Assoc. of Min. Elec. Engrs.) (22) Feb. 13.

Mining and Treatment of Lead and Zinc Ores in the Joplin District, Missouri. Clarence A. Wright. (Abstract of paper from U. S. Bureau of Mines.) (68) Feb. 14.

Messina Copper Mine, Northern Transvaal.* Owen Letcher. (103) Feb. 14.

Accident Prevention at the Nevada Consolidated. Lindsay Duncan. (Paper read before the Industrial Safety Conference.) (103) Feb. 14.

Top Slicing at Bingham.* D. W. Jessup. (16) Serial beginning Feb. 21.

Mining in the Belgian Congo in 1913.* Sydney H. Ball and Millard K. Shaler. (103) Feb. 21.

Mining Methods in the Bering River Coalfield, Alaska.* W. R. Crane. (103) Feb. 21.

Plant and Drilling Methods Employed in Constructing a Mine Drainage Tunnel.* (86) Feb. 25.

Lode Mining at Fairbanks. Hubert I. Ellis. (16) Feb. 28.

Miscellaneous.

Factors Determining a Reasonable Charge for Public Utility Service. M. E. Cooley. (4) Jan.

The Limitations of Mathematical Theory Applied to Engineering. W. G. Button. (2) Jan.

The Engineer's Part in the Regulation of Public Utilities. (Papers read before the Technical Conference at Stevens College.) (8) Jan.

The Status and Duty of the Engineer. J. A. Ockerson. (Paper read before the Engrs. Club of St. Louis.) (1) Feb.

Presidential Address of H. C. H. Shenton. (Paper read before the Soc. of Engrs.) (104) Feb. 6.

An Organ on Which Color Compositions are Played.* John W. N. Sullivan. (46) Feb. 21.

Municipal.

Concrete Roadways.* Lewis R. Ferguson. (2) Jan.

Colossal Waste Due to Bad Municipal Engineering. Bernard J. Newman. (2) Jan.

Road Signs.* Arthur E. Collins, M. Inst. C. E. (104) Jan. 30.

The Legal Precedents of 1913 in Relation to Municipal Engineering. J. B. Reignier Conder. (104) Jan. 30.

The Relative Economy of Constructing Bituminous Pavements by Penetration Methods.* George C. Warren. (Paper read before the Am. Assoc. for the Advancement of Science.) (60) Feb.

Pavements of Trenton, N. J.* Harry F. Harris. (60) Feb.

Methods and Cost of Constructing a Sand-Gumbo Road in Nebraska and Methods and Cost of Constructing a Brick-Cinder Road in Mississippi. (Abstract from *Bulletin No. 53*, U. S. Dept. of Agriculture.) (86) Feb. 4.

*Illustrated.

Municipal—(Continued).

Fixed Carbon Tests as Applied to Asphalts. Francis P. Smith. (96) Feb. 5.
Method and Cost of Constructing Concrete Road with Bituminous Wearing Surface in California.* C. L. Rakestraw. (86) Feb. 11.
Approximate Stresses Produced by a Concentrated Load on a Continuous Slab Supported on Earth or Other Yielding Foundation.* (Concrete Pavement Design.) J. W. Pearl. (86) Feb. 11.
Concrete Road Construction: a Symposium from Committee Reports to the National Conference on Concrete Road Building. (86) Feb. 18; (13) Feb. 19, Feb. 26; (14) Feb. 28.
Cost of Constructing a Concrete Pavement Surfaced with Asphaltic Oil and Stone Screenings for Huntington Drive, Alhambra, California.* Earnest F. Ayres. (86) Feb. 18.
A Concrete Road at La Salle, Ill. A. H. Hunter. (Abstract of paper read before the Ill. Soc. of Engrs. and Surveyors.) (13) Feb. 19.
Highways and Highway Surveying.* Daniel J. Hauer. (96) Serial beginning Feb. 19.
Standards of Concrete Road Construction, Recommendation as to Specifications, Construction, Maintenance and Costs Offered by Committees at National Conference on Concrete Road Building. (14) Feb. 21.
Investigation of the Causes of Expansion and Contraction of Concrete in Concrete Roads with Reference to the Prevention of Cracks.* R. J. Wig. (Report made to the Bureau of Standards.) (86) Feb. 25.
County Highway Improvements in Washington.* (86) Feb. 25.
Plant, Highway and Laboratory Inspection of Bituminous Materials. Francis P. Smith. (Paper read at Columbia Univ.) (96) Feb. 26.
Contraction and Expansion of Concrete Roads. (Abstract of Report at the National Conference on Concrete-Road Building.) (14) Feb. 28.
Recommendations for Concrete-Road Building, Principles Advocated by the National Conference on Concrete-Road Building. (14) Feb. 28.
Ueber Stampfbeton als Strassenpflaster. Ernst Schick. (51) Sup. No. 2.
Teerung in gepflasterten Strassen. F. Zink. (39) Jan. 20.
Die preussischen Gesetze und Verordnungen über den Verkehr auf den Kunststrassenseit 1879.* (40) Serial beginning Feb. 4.

Railroads.

Rigidity or Flexibility: Which is Best in Locomotive Boilers? J. W. Harkom. (65) Jan. 16.
Steel Frame Box Cars for the St. Louis & San Francisco Railway.* (23) Jan. 23.
Features of the Kalka-Simla Railway.* Lewis R. Freeman. (23) Jan. 23.
Heavy Narrow-Gauge Tank Locomotive for the Gold Coast Government Railways.* (23) Jan. 23.
Practical Results of Railway Electrification in Italy. (12) Serial beginning Jan. 23.
Some Limiting Factors in Electric Railway Engineering.* E. V. Pannell. (26) Jan. 23.
Gravitational Shunting.* J. W. J. Raikes. (From the *Royal Engineers' Journal.*) (23) Jan. 30.
Coupled 2-8-2 Single-Phase Alternating-Current Locomotive for the Rhaetian Railway (Switzerland).* (23) Jan. 30.
New Military Cars, Great Indian Peninsula Railway.* (23) Jan. 30.
New Mixed Traffic Locomotive, London & South-Western Railway.* (23) Jan. 30.
London, Brighton and South Coast Railway, Mogul Locomotive.* (12) Jan. 30.
Maintenance of Equipment Costs Compared with Locomotive Fuel Costs for Fiscal Year 1913. (18) Jan. 31.
Mikado Type Locomotives for the Erie Railroad.* (18) Jan. 31.
General Progress Report of Joint Committee on Induction Interference. (Authorized by the California State R. R. Comm.) (111) Jan. 31.
Maintenance of the Mechanical Equipment of the New York, Westchester & Boston Railway.* (17) Jan. 31.
Public Relations. Guy E. Tripp. (Paper read before the Am. Elec. Ry. Assoc.) (17) Jan. 31.
The Relations of the Public Service Companies and the Public. Henry W. Anderson. (Paper read before the Am. Elec. Ry. Assoc.) (17) Jan. 31.
Regulation or Profit-Sharing. Halford Erickson. (Paper read before the Am. Elec. Ry. Assoc.) (17) Jan. 31.
The Electric Installations of the Mittenwald Railway. H. Marchand. (88) Feb.
Watering the Tires and Greasing the Flanges of Locomotive Wheels. P. B. d'A. (From *La Technique Moderne.*) (88) Feb.
German and French Express Trains from the British Point of View. Wernekke. (From *Zeitung* des Vereins deutscher Eisenbahnverwaltungen.) (88) Feb.
Review of Traffic Questions. C. Colson. (From *Revue politique et parlementaire.*) (88) Feb.
1 D 1 Tank Locomotive, Series 1 100, of the Dutch States Railway Company.* (From *De Ingénieur.*) (88) Feb.

*Illustrated.

Railroads—(Continued).

2-8-0 Coal Engine, Great Northern Railway.* (21) Feb.
Grain Tight Construction for Single Sheathed Box Cars.* W. J. Tollerton. (25) Feb.
Cast Iron Wheel Records. H. H. Vaughan. (Paper read before the Canadian Ry. Club.) (25) Feb.
New 4-4-0 Express Engines, Great Central Railway.* (21) Feb.
Steam Motor Coach Operated by a Single Man, Chemin de Fer du Nord.* (21) Feb.
Drainage of Fills at Orangeville and Eldridge, Baltimore Division, B. & O. R. R.* Earl Stimson. (87) Feb.
Railroading Sixty Years Ago. C. D. Purdon. (Paper read before the Engrs. Club of St. Louis.) (1) Feb.
Electric Train-Lighting Systems.* T. Ferguson. (77) Feb. 2.
Methods of Constructing a Short Rock Tunnel on the New Low Grade Line Between Milwaukee and Sparta, Wis., Chicago & Northwestern Ry.* L. J. Putnam. (86) Feb. 4.
Improvements on the Louisville & Nashville R. R.* (13) Feb. 5, Feb. 26.
Railway Cross Ties.* J. L. Busfield. (96) Feb. 5.
Progress on the Mount Royal Tunnel.* (96) Feb. 5.
Internal Transverse Cracks and Fissures in Rails.* Robert Job. (15) Feb. 6.
Remarkable Railway Progress in Canada. J. L. Payne. (15) Feb. 6.
New Dining Cars for the Burlington.* (15) Feb. 6; (25) Feb.
Re-Appraisal of Railway Property in Nebraska. E. C. Hurd. (15) Feb. 6.
Construction of the Portland, Eugene & Eastern Railroad.* (23) Feb. 6.
An Inspection Locomotive, Philadelphia & Reading Company.* (23) Feb. 6.
New Meter-Gauge Tank Engines for the Uganda Railway.* (23) Feb. 6.
New Express Goods Engines, Caledonian Railway.* (23) Feb. 6.
Double-Ported Piston-Valves for Locomotives.* (11) Feb. 6.
The London and North-Western Railway: Dynamometer Tests.* (12) Feb. 6.
New Locomotive Repair Plant, Chicago and Northwestern Ry., Clinton, Iowa.* (18) Feb. 7.
Brake Efficiency, Chilled Iron *vs.* Steel Wheels.* F. K. Vial. (18) Feb. 7; (15) Feb. 13.
Pacific Type Locomotives for the Chicago Great Western R. R.* C. A. Prouty. (18) Feb. 7.
Decision of the Interstate Commerce Commission in the Industrial Railways Case. (18) Feb. 7.
Booster-Control Test on Metropolitan Railway, Paris.* Charles Jacquin. (27) Feb. 7.
Driving and Lining Point Defiance Tunnel.* (14) Feb. 7.
Railroad Fill of 1 500 000 Cubic Yards on Swampy Ground. (14) Feb. 7.
Railway Survey in Northern Patagonia, Argentina.* D. L. Reaburn. (13) Feb. 12.
Steel Box Cars; Pennsylvania Railroad.* (13) Feb. 12.
Studies of Operation, the Pittsburgh and Lake Erie.* (15) Feb. 13.
Electrification of Heavy Mountain Grades.* Joseph P. Ripley. (15) Feb. 13.
New York Central Station at Rochester, N. Y.* (15) Feb. 13.
The Coleman Cut-Off, Atchison, Topeka & Santa Fé.* J. B. Skeen. (15) Feb. 13.
Finchley Road and Wembley Park Widening, Metropolitan Railway. (23) Feb. 13.
The New Waterloo, London & South Western Railway.* (23) Feb. 13.
The Second Simplon Tunnel.* (12) Feb. 13.
The Union Railroad.* (18) Feb. 14.
Smoke Washing Apparatus, Englewood Roundhouse, L. S. & M. S. Ry.* (18) Feb. 14.
Structural Steel Passenger Car Trucks, Canadian Pacific Ry.* R. W. Burnett. (18) Feb. 14.
New Southern Pacific Line in Oregon.* (17) Feb. 14.
The Valuation of Railroads. C. A. Prouty. (Abstract of paper read before the Chamber of Commerce of the United States.) (17) Feb. 14; (18) Feb. 14; (14) Feb. 21; (15) Feb. 13.
Steaming Process for Ties and Timber.* J. H. Waterman. (Abstract from Report made before the Am. Wood Preservers Assoc.) (18) Feb. 14.
An Improved Rail-Joint for Portable Tracks.* (62) Feb. 16.
Some Railway Conditions Governing Electrification.* Roger T. Smith. (77) Feb. 16.
Modern Methods of Economical Railroad Location.* H. H. Edgerton, Jr. (86) Feb. 18.
Electric Railway Systems. C. E. Eveleth. (From *General Electric Review.*) (96) Feb. 19.
Interior Transverse Fissures in Rails.* P. H. Dudley. (20) Feb. 19; (15) Feb. 27.
The Actual Service of the Track Spike and Tie Plate. Walter D. Wood. (15) Feb. 20.
Laying Rail on the Lehigh Valley. (15) Feb. 20.
Atlantic Type Locomotives on the Pennsylvania.* (15) Feb. 20; (25) Feb.
The Pennsylvania Railroad's Safety Campaign. (15) Feb. 20.

*Illustrated.

Railroads—(Continued).

The Economical Operation of Work Trains. (15) Feb. 20.
Forms for Complete Rail and Ballast Records.* Jas. G. Wishart. (15) Feb. 20.
Results with Titanium-Treated Rails. (18) Feb. 21.
Charges of Extravagance in Construction of National Transcontinental Ry. of Canada.* (18) Feb. 21.
New York Central Change of Line at Rome.* (14) Feb. 21.
Maintenance of the Electrical Equipment of the New York, Westchester & Boston Railway.* (17) Feb. 21.
Economic Theory and Railway Rate Regulation. G. C. Hand. (15) Feb. 27.
Simplifying the Tonnage Rating Problem.* R. S. Mounce. (15) Feb. 27.
Grade Separation in McKees Rocks, Pa.* (15) Feb. 27.
Massachusetts Public Service Commission. (Abstract from First Annual Report.) (15) Feb. 27.
Utica Passenger-Station Subways.* (14) Feb. 28.
Additions to Elizabethport Shops of the Central Railroad of New Jersey.* (14) Feb. 28.
Calcul des Appareils de Changement de Voie.* M. Lefèvre et O. Saint-Amand. (38) Serial beginning Feb.
Note sur un Système de Suspension à Flexibilité Variable.* H.-C. Mestre. (38) Feb.
Voiture Automobile à Vapeur de la Compagnie du Chemin de Fer du Nord.* (34) Feb.
Massengüterbahnhöfe.* Kirchhoff. (102) Jan. 15.
Gasolin-Kleinlokomotive.* (102) Jan. 15.
Mitteilungen von den Nigerischen Eisenbahnen.* (40) Jan. 17.
Versuchsweise Anordnung des Oberbaues mit Buchenschwellen auf den badischen Stattseisenbahnen.* E. Lang. (40) Jan. 24.
Anleitung zur Bearbeitung von Betriebsdienstanweisungen. Heinrich. (40) Jan. 28.
Neubauten im Lokomotivdepot Brugg.* (107) Jan. 31.
Die Seigerung in Schienen.* S. Schukowsky. (102) Serial beginning Feb. 1.
Ueber die Tragkraft des Erdreiches.* A. Francke. (102) Serial beginning Feb. 1.

Railroads, Street.

Underground Interchange Station at Charing Cross.* (11) Jan. 23.
Electrolysis Mitigation in Springfield, Ohio. E. B. Rosa and Burton McCollum. (Abstract from *Bulletin No.* 27, U. S. Bureau of Standards.) (17) Jan. 31.
Track Standards for New Rapid-Transit Lines in New York.* Ellsworth L. Mills. (14) Feb. 7.
Underpinning New Deep Subway Excavation.* (14) Feb. 7.
Alternating-Current Supply in New York City.* (27) Serial beginning Feb. 7.
Rapid Transit Progress in London.* (17) Feb. 7.
The Evolution of Railway Motor Lubrication.* Alfred Green. (Abstract of paper read before the New England Street Ry. Club.) (17) Feb. 7.
Highway and Street-Railway Tunnels in San Francisco.* L. E. Torrey. (13) Feb. 12.
Extension of the Boston Subway.* (18) Feb. 14.
Electric-Railway Carhouse.* (14) Feb. 14.
Sand from Tidewater to Rail in Boston (Street Railway Construction).* Edward Dana. (17) Feb. 14.
A Single-Truck Convertible Car for New York Suburbs.* (17) Feb. 14.
Wittenbergplatz-Dahlem Extension of Berlin Subways.* (17) Feb. 14.
Times Square Subway Station in New York, Alternative Designs Proposed for Stations at the Intersection of Old and New Lines at Broadway and Forty-second Street.* (14) Feb. 21.
The Louisville Railway's New Generating Station.* (17) Feb. 21; (27) Feb. 28.
Extensible Platform in New York Subway.* (17) Feb. 21.
Système Auto-Régulateur de Traction Electrique Essais du Métropolitan de Paris.* (33) Jan. 31.
Vorstudien zur Einführung des selbsttätigen Signalsystems auf der Berliner Hoch- und Untergrundbahn. C. Kemmann. (41) Serial beginning Feb. 5.
Les Extensions du Métropolitain Electrique de Berlin et la Traversée Souterraine de la Sprée.* (33) Feb. 7.

Sanitation.

A New Type of Electrically Operated Automatic Apparatus for Contact Beds.* (104) Jan. 30.
A Brief Discussion of Imhoff Tanks.* Leslie C. Frank. (36) Feb.
Sinking a Sea-Outlet.* William M. Aitchison. (36) Feb.
Some Features in the Design of Sewer Systems.* C. F. Fisher. (36) Feb.
The Main Drainage Works Proposed for New York. George A. Soper. (109) Feb.
The Refuse Incinerator at Moose Jaw, Canada. F. Cartlidge. (60) Feb.
Some Suggested Designs for Sewage Treatment Plants for Residences and Small Institutions.* Paul Hansen. (Paper read before the Am. Soc. of Agri. Engrs.) (86) Feb. 4.

*Illustrated.

Railroads—(Continued).

The Economical Operation of Work Trains. (18) Feb. 21.
Terms for Complete Rail and Ballast Records.* 1p. (1) Warman. (18) Feb. 20.
Results with Thawing-Treated Rails. (18) Feb. 21.
Charges of Extravagance in Construction of National Transcontinental Ry. of Canada.* (18) Feb. 21.
New York Central Change of Line at Rome.* (14) Feb. 21.
Maintenance of the Electrical Equipment of the New York Westchester & Boston Railway.* (17) Feb. 21.
Economic Theory and Railway Rate Regulation. G. C. Hand. (18) Feb. 27.
Simplifying the Tonnage Rating Problem.* E. S. Mannix. (18) Feb. 27.
Grade Separation in McKees Rocks, Pa.* (18) Feb. 27.
Massachusetts Public Service Commission. (Abstract from Third Annual Report) (18) Feb. 27.
Tilden Passenger-Station Subways.* (14) Feb. 28.
Additions to Elkhorkport Shops of the Central Railroad of New Jersey.* (14) Feb. 28.
Calcul des Appareils de Changement de Voie.* M. Lefèvre et O. Saint-Germain. (18) Feb. 28.
Serial Indexing Plan. (18) Feb.
Note sur un Système de Suspension à Tractibilité Variable.* H.-C. Mercier. (18) Feb.
Voiture Automobile à Vapeur de la Compagnie du Chemin de Fer de Nord.* (14) Feb.
Massenberechnungen.* Rosenbach. (10) Jan. 1a.
Dissenso-Kinematometer.* (10) Jan. 1a.
Widerstände von den Nietreihen Einschalten.* (10) Jan. 1a.
Verschiedene Anordnung der Oberbauen mit Isolierungsmitteln auf den Bahnhöfen. (10) Jan. 1a.
Elektrochemisches. H. Lang. (10) Jan. 2a.
Aufsätze zur Theorie von Isolationsmaterialien. Dietrich. (10) Jan. 2a.
Explosion im Lokomotivdepot Dresden.* (10) Jan. 2a.
Die Sprengung in Schlempp.* S. Schiffowsky. (10) Serial beginning Jan. 2a.
Ueber die Tragkraft der Eisenbeton.* A. Fraenkel. (10) Serial beginning Feb. 1.

Railroads, Street.

Underground Interchange Station at Christie Street.* (1) Jan. 31.
Electrolysis Mitigation in Springfield, Ohio. E. P. Rose and Dieter. Abridged. (17) Jan. 31.
Track Standards for New Eagle-Transit Lines in New York.* Elsworth S. Mills. (18) Feb. 7.
Underpinning New Deep Subway Excavation.* (14) Feb. 7.
Alternative-Current Supply in New York City.* (17) Serial beginning Feb. 7.
Rapid Transit Progress in London.* (1) Feb. 7.
The Evolution of Railway Motor Ventilation.* Alfred Gradenwitz. (Abstract of paper read before the New England Street Ry. Club.) (17) Feb. 7.
Railway and Street-Railway Tramps in San Francisco.* C. E. Teeter. (18) Feb. 12.
Extension of the Boston Subway.* (18) Feb. 14.
Electric-Railway Carhouse.* (14) Feb. 14.
Rapid Transit Tubes for Manhattan Island.* (17) Feb. 14.
Dana. (17) Feb. 14.
A Single-Track Connection for the New York Subway.* (17) Feb. 14.
Williamsburg-Bridge Extension of Lexington Avenue Subway.* (1) Feb. 14.
Times Square Subway Station in New York City.* (1) Feb. 14.
Stallings at the Intersection of Old and New Lines at Broadway and Third Street.* (14) Feb. 21.
The Louisville Railway's New Operating Station.* (17) Feb. 21.
Elevated Platform in New York Subway.* (17) Feb. 21.
Système Auto-Remiseur de Tramcar Électrique Essais de Différentes Voitures. (35) Jan. 31.
Verstellbare Bügelführung des schleifenden Stromabnehmers auf der Berliner Hoch- und Untergrundbahn. C. Hoffmann. (41) Serial beginning Feb. 1.
Les Extensions du Métropolitain Électrique de Paris et de Trocadéro Souterrain de la Gare.* (35) Feb. 7.

Sanitation.

A New Type of Electrically Operated Automatic Apparatus for Water Tests.* (10) Jan. 30.
Brief Discussion of Imhoff Tanks.* Leslie C. Frank. (36) Feb.
Sinking a Sea-Outlet.* William M. Although. (40) Feb.
Some Features in the Design of Sewer Systems.* C. P. Fuller. (36) Feb.
The Main Drainage Works Proposed for New York. George A. Soper. (10) Feb.
The Norton Incinerator at Moose Jaw, Canada.* (10) Feb.
Some Suggested Designs for Sewage Treatment Plants for Residential Districts.* Paul Hansen. (Paper read before the Am. Soc. of Mun. Improvements.) (36) Feb.

*Illustrated.

Sanitation—(Continued).

The Design and Operation of Small Sewage Pumping Stations. Samuel A. Greeley and Langdon Pearse. (Paper read before the Illinois Soc. of Engrs. and Surveyors.) (86) Feb. 4.
Results of Studies Made to Determine Effect Upon Fish Life of Sewage and Sewage Treatment Plant Effluents. (86) Feb. 4.
Sewage Treatment by Aëration and Contact in Tanks Containing Layers of Slate. H. W. Clark and George O. Adams. (14) Feb. 7.
Rainfall, Sewage, Storm and Tidal Water in New York Harbor. (Abstract of Report by Met. Sewerage Comm. of New York.) (14) Feb. 7.
Quicksand Excavation at Battle Creek. (Laying Sewer Pipe.) W. W. Bridgen. (Paper read before the Mich. Eng. Soc.) (14) Feb. 7.
Sewage Treatment at Sturgis, Michigan.* H. C. Sherman. (Abstract of paper read before the Mich. Eng. Soc.) (14) Feb. 7.
Methods and Costs of Constructing Large Brick and Concrete Sewers in Chicago, with Notes on the Cost Keeping System Employed.* H. R. Abbott. (Paper read before the Illinois Soc. of Engrs. and Surveyors.) (86) Feb. 11.
A Comprehensive Sewage-Disposal Project for New York City.* (13) Feb. 12.
Concrete Sewer Pipe at Kansas City, Mo. E. S. Wallace. (Abstract of paper read before the Ill. Soc. of Engrs. and Surveyors.) (13) Feb. 12.
Interbay District of North Trunk Sewer at Seattle.* (14) Feb. 14.
The Design of Storm Sewers.* John G. Schmidt. (13) Feb. 19.
Wood Furnace Heating in a Michigan Home.* (101) Feb. 20.
Fresh Air in Schoolrooms.* John B. Todd. (19) Feb. 21.
Results of Sewage Treatment at Columbus, Ohio. C. B. Hoover. (14) Feb. 21.
Data and Discussion on Explosions in Sewers and Underground Conduits, Ordinances, Inspection, Ventilation and Other Preventive Measures. H. J. Kellogg. (Paper read before the Connecticut Soc. of Civ. Engrs.) (86) Feb. 25; (14) Feb. 28.
Methods Employed in Making Reinforced Concrete Sewer Pipe in the Open During Freezing Weather at Louisville, Ky. G. D. Crain. (86) Feb. 25.
Investigation of Concrete Drain Tile in Alkali Regions. (13) Feb. 26.
A Ward-Cooling Plant in a Hospital.* A. M. Feldman. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) (101) Feb. 27.
Les Rayons Ultra-Violets et leurs Récentes Applications Chimiques et Biologiques. Daniel Berthelot. (32) Dec.
Distribution Automatique des Eaux d'Egout à la Station d'Epuration de Mont-Mesly par la Système Lajotte-Laffly.* (35) Feb.
Die Vorgänge in einer Warmwasserheizung. G. de Grahl. (7) Jan. 17.
Sicherheitsvorrichtung für Warmwasserheizungen. Karl Schmidt. (7) Jan. 17.
Untersuchung der Anheizdauer bei Heizungsanlagen.* Ralph C. Taggard. (7) Jan. 24.
Formaldehyd-Vakuum-Desinfektionsapparate.* Hans Krüger. (7) Jan. 31.

Structural.

On a Method of Preparing Sections of Fractures of Steel for Microscopic Examination.* Alfred Campion and John M. Ferguson. (71) Vol. 88.
So-Called Crystallisation Through Fatigue.* F. Rogers. (71) Vol. 88.
A New Method for the Determination of the Critical Points Ar. 1, Ac. 1.* J. E. Stead. (71) Vol. 88.
Present Methods of Testing with Special Reference to the Work of the International Testing Association. H. Hubert. (71) Vol. 88.
Report of Committee on Specifications and Methods of Tests for Concrete Materials (Am. Concrete Inst.). (110) Nov.
Effects of Electric Currents on Concrete. E. B. Rosa, Burton McCollum and O. S. Peters. (110) Serial beginning Nov.
Tests of Reinforced Concrete Columns.* (110) Dec.
The Development of Concrete Grain Elevator Construction.* R. P. Durham. (110) Dec.
Boston Foundations. J. R. Worcester. (109) Jan.
The Grand Stand for the University of Chicago. Charles Hodgdon. (4) Jan.
The Preservation of Iron and Steel Structures. F. Crosby-Jones. (Abstract of paper read before the Inst. of Marine Engrs.) (47) Jan. 30.
Steel Sheet Piles in Excavation Works.* Jules R. Breuchaud. (60) Feb.
The Design of a Structural Steel Plant.* E. H. Darling. (From *Applied Science.*) (86) Feb. 4.
The Testing of Sand for Use in Concrete, Field and Laboratory Practice.* Cloyd M. Chapman. (13) Feb. 5.
A Method of Strengthening Roof Trusses.* (96) Feb. 5.
Animal and Vegetable Oils; Their Preparation and Uses. R. C. Griffin. (72) Serial beginning Feb. 5.
Moist-Air Timber-Dryers.* (11) Feb. 6.
The Design of Plain and Retaining Walls.* F. Noel Taylor. (104) Feb. 6.
The Protection of Iron and Steel by Paint Films.* Norman A. Dubois. (From the *Journal of Industrial and Engineering Chemistry.*) (19) Feb. 7.

*Illustrated.

*Illustrated.

Structural—(Continued).

Balcony of Empress Theater in Portland, Oregon, Radial Girders and Trusses Supporting Inclined Cantilever Floor.* (14) Feb. 7.
Buildings for Small Holdings.* A. Ainsworth Hunt. (Paper read before the Soc. of Archts.) (104) Feb. 13.
Compound Piles of Timber and Ferro-Concrete.* R. Schönhöfer. (104) Feb. 13.
Seventeen-Acre Addition to an Industrial Plant in Detroit, Michigan.* (14) Feb. 14.
Reinforced-Concrete Footing Design for Columns.* W. A. Hoyt. (14) Feb. 14.
Concrete-Steel Fence Posts.* William M. Stieve. (14) Feb. 14.
New Method of Centering Concrete in Building Work.* W. P. Anderson. (14) Feb. 14.
Re-rolled Steel Reinforcing Bars, Log of Tests and Specifications for Concrete Reinforcement made from Discarded and Old Rails. W. K. Hatt. (Abstract of paper read before the Indiana Eng. Soc.) (14) Feb. 14.
Construction of the Caisson Foundation for the J. P. Morgan & Co. Building, New York.* (86) Feb. 18.
The Safe Loads on Derrick Booms and Other Long Compression Members.* (13) Feb. 19.
A Simplified Proof of the Three-Moment Formula for Continuous Beams.* S. E. Slocum. (13) Feb. 19.
Reinforced Concrete Columns in Various Building Codes.* (13) Feb. 19.
Sewer-Pipe and Roofing-Tile Tests of Western Canada Clays. (Abstract from the Report of Canada Geol. Survey.) (96) Feb. 19.
Test of Reinforced Brickwork. Chas. H. Edmonds. (96) Feb. 19.
Creosote Oil. P. C. Reilly. (Abstract of paper read before the Am. Wood Preservers Assoc.) (15) Feb. 20.
Building Collapses at South Bend, Indiana.* (14) Feb. 21.
The Structural Requirements of the Toronto Building By-Law of 1913. C. R. Young. (96) Feb. 26.
Measurement of Gravel in Piles. Oliver Clark. (13) Feb. 26.
Dome of the Kahn Building in San Francisco.* (14) Feb. 28.
Pneumatic Caisson Foundations 100 Feet below Street Level.* (14) Feb. 28.
Aciers à Outils.* M. Denis. (93) Jan.
Table des Normes de tous les Pays pour le Ciment Portland. (84) Jan.
Papier ou Toile pour les Sacs à Ciment. (84) Jan.
De l'Influence des Laitiers sur la Qualité des Ciments de Laitiers. Robert Malfait. (35) Feb.
Durchrechnung einer Rahmenkonstruktion.* Max Sieb. (51) Sup. No. 3.
Der Neubau der Seidenweberei Michels & Cie. in Nowawes bei Potsdam.* Karl Bernhard. (48) Serial beginning Jan. 3.
Berechnung einer freitragenden Kunsteintreppe.* Lewandowsky. (80) Jan. 17.
Neuere Ausführungen der Bulbeisendecke im Hochbau und Ingenieurbauwesen.* G. Kaufmann. (78) Jan. 20.
Berechnung von Eisenbetonhohlsteindecken.* Knoll. (78) Jan. 20.
Wasserdichter Zement.* Paschke. (78) Jan. 20.
Beitrage zur Frage der Bestimmung des Ferrostatischen Druckes auf Formen und Kerne.* Hugo Becker. (50) Jan. 29.
Einiges über Kerbschlagversuche und über das Ausglühen von Stahlformguss, Schmeidestücken u. dgl. E. Heyn und O. Bauer. (50) Serial beginning Feb. 8.
St. Nicolaikirche in Billwärder a. d. Bille.* K. Clauss. (78) Feb. 9.
Erfahrungen mit Gussbeton.* O. Franzius. (78) Feb. 9.
Abbruch eines modernen Eisenbetonbaues.* Ernst Schick. (78) Feb. 9.
Der Einfluss der Endbefestigung der Zugeisen auf die Tragfähigkeit.* Fritz v. Emperger. (78) Feb. 9.

Topographical.

The Zeiss Level.* Joseph Husband. (Paper read before the Midland Inst. of Min., Civ. and Mech. Engrs.) (106) Vol. 46, Pt. 2.
Methods and Cost of Making a Topographic Resurvey on the Truckee-Carson Project, Nevada.* L. E. Gale. (86) Feb. 25.
Ueber die Grosse der mittleren Stationsfehler beim Nivellieren mit Instrumenten der Firma Zeiss.* H. Löschner. (53) Jan. 30.

Water Supply.

Small Water Purification Plants: A Plea for Their More Efficient Operation. H. P. Letton. (28) Dec.
The Care and Maintenance of Meters and the Effect on Revenues.* A. W. Cuddeback. (28) Dec.
Cleaning Water Mains at Hartford, Conn.* Caleb M. Saville. (28) Dec.
Loss of Head in Bends.* W. E. Fuller. (28) Dec.
Advisability of Securing Legislation for Making Water Bills a Lien Upon Property Supplied. (28) Dec.

*Illustrated.

Structural—(Continued).

Heating of Concrete Theater in Portland, Oregon. Illus. (Sept. Timber and Timber Engineering for Small Buildings.* A. Ainsworth Hall. (Paper read before the Mo. of Arch.) (1913) Feb. 12.

Creosoned Pile of Timber and Preservation.* H. Schneider. (1913) Feb. 12.

Sewage-Gate Addition to an Industrial Plant in Detroit, Michigan.* (14) Feb. 14.

Reinforced-Concrete Roofing Design for Columns.* W. A. Hoyt. (14) Feb. 14.

Concrete-Steel Floor Tests.* William M. Shaw. (14) Feb. 14.

New Method of Centering Concrete in Building Work.* W. P. Anderson. (14) Feb. 14.

Fire-Proof Steel Reinforcing Bar. Log of Tests and Specifications and Comparison made from Recorded and Old Data. W. K. Hatt. (Abstract of paper read before the Indiana Eng. Soc.) (14) Feb. 14.

Construction of the Caisson Foundation for the J. P. Morgan & Co. Building, New York.* (14) Feb. 14.

The Safe Loads on Derrick Booms and Other Large Compression Members.* (14) Feb. 19.

A Simplified Proof of the Three-Moment Formula for Continuous Beams.* E. T. Bloom. (13) Feb. 19.

Reinforced Concrete Columns in Various Building Codes.* (14) Feb. 19.

Sewer-Pipe and Roofing-Tile Tests of Western Canada Clays. (Abstract from Report of Canada Geol. Survey.) (90) Feb. 19.

Test of Reinforced Brickwork. (Thos. H. Edmonds.) (90) Feb. 19.

Testing Oil. P. C. Reilly. (Abstract of paper read before the Am. Wood-Preservers Assoc.) (13) Feb. 20.

Building Collapses at South Bend, Indiana.* (14) Feb. 21.

The Structural Requirements of the Terrein Building Bye-laws of 1912. C. H. Tribe. (90) Feb. 26.

Measurement of Crevel in Piles. Oliver Clark. (13) Feb. 26.

Theme of the Kahn Building in San Francisco.* (14) Feb. 26.

Permanente Cement Foundations 100 Feet below Street Level.* (14) Feb. 26.

Arbre à Oscille.* M. Imale. (93) Jan.

Table des Normes de Cote les Pays pour le Ciment Portland. (84) Jan.

Taylor on Tide Power by Gas & Cement. (84) Jan.

Le Tirefonage des Lattes sur la Qualité des Ciments. M. Lattore. Robert Maillet. (35) Feb.

Durchbiegung einer Eisenbetonplatte.* Max Pich. (81) Aug. No. 2.

Der Norden der Rotkanwerkerei Michels & Cie. in Nowawes bei Potsdam.* Kurt Dorbrand. (48) Serial beginning Jan. 2.

Berechnung einer rechteckigen Kuppelplatte.* Lewandowski. (80) Jan. 17.

Neuere Ausführungen der Eisenbetonbauten im Hochbau und Ingenieurwesen.* G. Kaufmann. (78) Jan. 20.

Berechnung von Eisenbetonbalkendecken.* Kholl. (78) Jan 20.

Wasserdichter Zement.* Paschke. (78) Jan. 20.

Beitrage zur Frage der Berechnung des Perrochetschen Druckes auf Formen und Lehren.* Hugo Pecher. (80) Jan. 20.

Bilder über Kerbschlagversuche und über das Ausglühen von Stahlformguss, Schmiedestücken u. dgl. E. Heyn und O. Bauer. (80) Serial beginning Feb. 8.

Nicolaikirche in Hillwarder a. d. Bille.* R. Claass. (78) Feb. 3

Betonbauten mit Asphaltmörtel. O. Frankin. (78) Feb. 3

Abbruch alter moderner Eisenbetonbauten.* Ernst Bolck. (78) Feb. 3

Der Einfluss der Zeitdauerbelastung der Zugeisen auf die Tragfähigkeit.* Prof. Dr. Emperger. (78) Feb. 3

Topographical.

The Zeiss Level.* Joseph Hayward. (Paper read before the Midland Inst. of Min. Civ. and Mech. Engrs.) (100) Vol. 10, Pt. 2.

Methods and Cost of Making a Topographic Survey on the Truckee-Carson Project, Nevada.* I. E. Dade. (80) Feb. 22.

Ueber die Grosse der mittleren Stationslänge beim Nivellieren mit Instrumenten der Firma Zeiss.* H. Lüschner. (33) Jan. 20.

Water Supply.

Small Water Purification Plants: A Plea for Their More Efficient Operation in Rural Districts. H. P. Learmonth. (28) Dec.

The Cure and Maintenance of Mixers and the Effect on Revenues.* A. W. Cudde back. (28) Dec.

Cleaning Water Mains at Hartford Conn.* Caleb M. Saville. (28) Dec.

Loss of Head in Pipe.* W. E. Fuller. (28) Dec.

Advisability of Securing Legislation for Making Water Rills a Lien Upon Property Supplied. (28) Dec.

* Illustrated.

Water Supply—(Continued).

Testing of Horizontal Lowhead Water Turbines.* Lucius B. Andrus. (4) Jan.
The Hudson River Crossing of the Catskill Aqueduct.* Ralph N. Wheeler. (2) Jan.
The Utilization of Water as it Affects Industry. Farley Gannett. (98) Jan.
The Hindia Barrage on the Euphrates.* (12) Jan. 23.
Water-Raising and Measurement.* W. H. Booth. (Abstract of paper read before the Assoc. of Engrs.-in-Charge.) (47) Jan. 30.
The Rjukan Hydro-Electric Power-Station, Norway.* (11) Jan. 30; (12) Feb. 6.
The Speel River Electro-Chemical Project. W. P. Lass. (103) Jan. 31.
The Lahontan Dam.* A. V. Leonard. (67) Feb.
The Water Works of Oshkosh, Wis. (60) Feb.
Sinking of a Steel Well at Galesburg, Ill.* (60) Feb.
The Bridgeton, New Jersey, Water Filtration Plant.* Henry Ryon. (36) Feb.
Operating Characteristics of Centrifugal Pumps. A. B. Morrison, Jr. (64) Feb. 3.
Softening Boiler Feed Water. E. H. Robie. (64) Feb. 3.
Prescribed Procedure for Laying 9-ft. Steel or Concrete Pipe in Existing 12-ft. Brick Water Supply Conduit at Baltimore, Old Conduit Alternately In and Out of Service.* (86) Feb. 4.
The Occurrence and Isolation of *B. Coli* in Water. C. M. Hilliard. (Paper read before the Eng. Soc. of Purdue Univ.) (86) Feb. 4.
Notes on the Proper Use of Chlorinated Lime for the Disinfection of Drinking Water. M. L. Holm and E. R. Chambers. (Abstract from *Michigan Public Health Journal.*) (86) Feb. 4.
The Silver Lake Reservoir of the Catskill Water Supply System, New York City.* Orrin L. Brodie. (13) Feb. 5.
Horseshoe Falls Hydroelectric Plant.* Harold S. Johnston. (14) Feb. 7.
New Water-Works Intake Tunnel and Tower for St. Louis, Mo.* (13) Feb. 12.
Water Powers on the Winnipeg River.* (Report of the Water Power Branch to the Public Utilities Comm.) (96) Feb. 12.
Centrifugal Pumping Machinery.* J. W. W. Drysdale, Jr. (96) Feb. 12.
Cleaning a Water-Works Intake Well at Florence, Kan.* H. M. Plaisted. (13) Feb. 12.
The Irrigation of Southern Alberta.* (12) Feb. 13.
Financing Irrigation and Power Development.* John H. Lewis. (111) Feb. 14.
Failure of Horse Creek Dam in Colorado.* Newton L. Hall and John E. Field. (14) Feb. 14.
The Lardner's Point Pumping Plant.* Warren O. Rogers. (64) Feb. 17.
Construction Features of the Intake Dam of the Tallulah Falls Development, for the Georgia Railway and Power Co. in Georgia.* Charles Adsit and Eugene Lanchli. (86) Feb. 18.
Structural Features of an Interesting Small Hydro-Electric Power Plant on the Sandusky River at Ballville, Ohio.* James C. Mills. (86) Feb. 18.
The Consulting Engineer in Water Works Practice. John W. Alvord. (86) Feb. 18.
Methods Employed in Laying an 8-In. 9-Mile Wood Pipe Line for Railway Water Supply at Stoughton, Canada. (86) Feb. 18.
Methods of Paying for Water Works Mains. (13) Feb. 19.
A Large Steel Water Tank.* (13) Feb. 19.
The Answer to What is the Matter with Irrigation. E. P. Osgood. (13) Feb. 19.
The New Water Intake at East St. Louis, Ill.* (13) Feb. 19.
Rainfall, Evaporation and Runoff in Manitoba.* (Abstract from Report of the Dept. of the Interior of Canada.) (96) Feb. 19.
Prevention of Water Waste on Railroads.* C. R. Knowles. (15) Feb. 20.
Hydroelectric Plant Cost Considerations.* J. C. Ralston. (111) Feb. 21.
Development of the Ocampo Power Plant.* Robert Linton. (16) Feb. 21.
Laying Out New Water-Supply System for Victoria, B. C. (14) Feb. 21.
Influence of State Regulation Upon Economy and Efficiency in the Operation of Water Works Properties. Wynkoop Kiersted. (86) Feb. 25.
Use of Well Points for Unwatering Quicksand in Excavation at Battle Creek, Mich., for Pumping Station, Suction-Storage Basin, and Clay Pipe Supply Line in Deep Cut. W. W. Brigden. (Paper read before the Michigan Eng. Soc.) (86) Feb. 25.
General Specifications Under Which 3, 4 and 6 In. Meters of Velocity and Disk Type are Purchased by St. Louis Water Department. (86) Feb. 25.
Method and Cost of Laying Two 500-ft. Experimental Sections of 30-in. Steel and Ingot Iron Lockbar Pipe at Utica, N. Y. A. W. Peters. (86) Feb. 25.
Power Development at Long Lake, Alaska. E. P. Kennedy. (Abstract from *Western Engineering.*) (96) Feb. 26.
Nelson and Churchill River Basins.* (96) Feb. 26.
An Ice-Emergency Water Intake at Waukegan, Ill. (13) Feb. 26.
Hollow Concrete Dam for Coatesville Waterworks.* (13) Feb. 26; (86) Feb. 11.
Mechanical Filtration Plant for Toronto.* (14) Feb. 28.
Power Development at Saxon Falls.* C. A. Alderman. (14) Feb. 28.
Chemical Fire Extinguishers. Wendt. (From *Zeitschrift für angewandte Chemie.*) (19) Feb. 28.

*Illustrated.